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The Chemical Age

A Weekly Journal Devoted to Industrial & Engineering Chemistry

VOL. II. APRIL 3, 1920 No. 42

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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Other communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to "The Chemical Age" is 21/- per annum for the United Kingdom, and 26/- Abroad. Cheques, P.O.O.'s, and Postal Orders should be payable to Benn Brothers, Ltd.

Editorial & General Offices—8, Bouverie Street, London, E.C.4.

Telegrams: "Allangas, Fleet, London." Telephone: City 9852 (4 lines).

A Research Appointment

PROFESSOR H. E. ARMSTRONG'S recent lament over the threatened absorption of the professoriate in industry will be recalled and perhaps renewed by another appointment just announced—namely, that of Dr. A. W. Crossley, Daniell Professor of Chemistry at King's College, London, to be Director of Research to the British Cotton Industry Research Association, whose headquarters are in Manchester. The appointment was really made in November last, and Professor Crossley leaves for Manchester this week and enters upon his new work at once. It is work of a very responsible character, with scarcely any limits to its potentialities, and Professor Crossley brings to it high academical qualifications, combined with considerable practical knowledge of experimental work. The appointment offers a great opportunity in the organisation of research, and the idea will doubtless be taken up with all the thoroughness which characterises the great cotton firms of the North. Already the Towers, a large mansion at Didsbury, has been bought to serve as a central Institute, and an appeal is to be issued for a quarter of a million. Dr. Crossley will have general charge of the research work, which will be carried on in five departments—chemistry, physics, botany, engineering, and technology. Each Department will have its own staff of experts, and the heads of the departments will constitute a permanent board, with Dr. Crossley as Chairman. No scheme of research has yet been worked out in detail, but generally the aim will be to displace "rule of thumb" knowledge by the results of scientific research and experiment, though it is often found that "rule of thumb" practices are themselves unconsciously scientific in being based on a long experience—the layman's equivalent for the scientist's experiment. The existing processes will be tested as well as new methods of treatment and finishing. One extremely interesting problem of a general character is to be investigated. There is a sort of tradition that the humidity of the climate of the Lancashire cotton area accounts in some way for the excellence of its fine cotton goods, as the water of the river Lys is supposed to give some special virtue to Belgian flax products. This is one secret which Dr. Crossley hopes to extract.

While on this subject of research, mention may be made of a curious report which reaches us concerning the transfer of a member of the staff of a research organisation to a private enterprise. It is stated that a transfer fee had to be paid to the credit of the funds of the Association. The practice is common in reference to the transfer of professionals from one football club to another, but this is the first occasion on which we have heard of it in connection with research.

Education and Chemical Industry

THE dominant note of to-day is "educate." Down the continuous gamut of the scale, from the employer at the one end to the workman at the other, the theme is the same: education is the cheapest national commodity. This applies with especial force to the chemical industry, which never has needed more a high educational standard in applied science than it does to-day, and it should be a matter of importance to a large number of those who, embued with a keen interest in science, pass directly from secondary schools to works' practice—whether on the plant, or in the laboratory. A youth, under such conditions, after serving a variable period of years as apprentice or assistant, has acquired an industrial experience that his academic brother of equal age has yet to gain, but unless his studies—apart from his necessary work—are directed wisely, it is more than probable that his scientific horizon will be limited, and his knowledge confined to the particular niche occupied by his daily routine.

The curriculum dispensed at evening class centres seems, as a rule, to be singularly deficient in those

qualities which appear essential if it is to provide a student with qualifications for his subsequent work in life. Experience indicates that in applications for posts, a University degree or a diploma granted by such bodies as the Institute of Chemistry or the Manchester School of Technology has a distinct and financial value. This is not on account of any fictitious academic halo investing the magical letters involved, but rather because the possession of the qualification in question is a guarantee that the holder has completed an organised course designed by those who should be in a position to judge best of its value, and which includes not only a special subject, but others closely related to it. Such a qualification outweighs —and rightly so—a series of Board of Education certificates of various consecutive grades that can be acquired at a candidate's inclination or humour in one science only, and which need require not the slightest knowledge concerning allied subjects. The chemist of to-day, and of the future, must be physicist and mathematician also: the problems that requires solution rarely lie in the domain of pure chemistry—whatever that may be—but are situate in those borderlands adjacent to other fields of knowledge. Those who are content to remain on the lower slopes of the industry need not trouble themselves further but those who wish to scale the heights, either must equip themselves for the task, or fail in the project.

We commend this subject as one for urgent attention to those societies that interest themselves in the status and advancement of the chemist, for the new academic year begins in September, and there is no time to be lost if the student from the works who studies by night, is not to be handicapped unduly in the struggle with his more fortunate competitor who studies by day. We do so in the hope that the various academic authorities will be approached with a view to arranging co-ordinated courses of study, and we would welcome any fruitful discussion concerning the same, as we believe that such education would benefit materially the industry. The College, it is sometimes said, is being lured into trade. Would that the trade were being lured into college! Unanimity on the details of any suggested syllabus probably would be difficult to obtain, but the following sketch will indicate what might constitute a basis for argument :—

First year.—Completion of general education to the standard required by the College of Preceptors, with the addition of chemistry.

Second year.—Elementary Mathematics, Inorganic Chemistry, Physics, and Applied Mathematics up to the standard of Intermediate B.Sc.

Third year.—Physics (Light and Heat), Organic and Inorganic Chemistry.

Fourth year.—Physics (Electricity and Magnetism), Organic and Inorganic Chemistry.

Fifth year.—Advanced General Chemistry, and a training in Chemical Engineering.

Such a course would require an application of three hours a night for three or four nights a week, and would culminate for the sixth year in an advanced study of that section in which the student found his daily work: it would involve not more work than a diligent student at present expends during attendance at evening classes for five or six years. Of necessity such a scheme is tentative, but we are of the opinion that if a student applied himself to it with assiduous industry, he ultimately would be scarcely a whit behind his brother who had graduated by the normal methods of day classes. It is based upon the indisputable fact that it is a far better way, thoroughly to comprehend the principles of chemical science than to essay the impossible task of being expert in universal chemistry without the knowledge born of understanding.

A New Benzol Problem

Now that the motorist is building hopes on a national benzol supply he would do well—lest his actions should be misconstrued—to take warning from some experiences which are reported from Germany. According to Herr Schwenke there is such a thing as coming too closely in contact with benzol fumes. They are responsible, he says, for a form of poisoning which, apparently, gives rise to symptoms and behaviour more usually associated with inebriety. Our German authority backed up his [illegible] with practical examples, and quoted the case o[illegible]kman who, deputed to clean the interior of a [illegible]nk-wagon, was subsequently discovered in a state of exaggerated ecstacy, "flooding the world with song." Fortunately his fantastic *appogiaturas* attracted the attention of his foreman, and after exposure to the fresh air he quickly recovered.

A second example proved rather more serious. It was a question of cleaning out an ammonia saturator, for which purpose benzol was used. In this case the man was subsequently found in a state of unconsciousness, and with great difficulty he was restored by being returned intermittently to semi-consciousness with the aid of compressed air, but the recovery took five hours. He was taken to hospital, where he was retained for a week. A third instance was more serious still. The inlet pipe of a benzol distilling plant had become choked with naphthalene with the result that, when the attendant removed a cover to see what had happened, the back pressure in the plant caused a heavy escape of fumes. As a result, he lay unconscious in the hospital for several days, and, apart from injury to his vocal chords, his speech was not natural for several weeks. The seriousness of the case was probably due to the fact that in this instance gaseous sulphur compounds were present with the benzol fumes. So far as we can remember, no instances of this peculiarity of benzol have been met with in this country, but we repeat the warning for what it is worth.

A Question of Spelling

WHILE speaking of benzol we feel that the time has arrived for some attempt at a more consistent spelling of the word. At the present time there are two schools in evidence. Those who are embraced by the term chemist almost universally prefer the word spelt without the final "e"; but motorists, on the other hand, appear to recognise nothing but "benzole." The situation has been complicated by the fact that the recognised distributors have baptised themselves The National "Benzole" Association, and they have, accordingly, added a little more confusion. It is well known, of course, that a slight departure from the correct spelling may, when dealing with things chemical, quite alter the sense. For instance, benzine is the distillate obtained from petroleum, while benzene

is the some hydrocarbon yielded by coal. The difference is, therefore, a matter of importance, but—to come down to commercial terms—no question of the kind arises in the case of benzol and benzole. Exception has been taken to the word benzol because the "-ol" termination is of German origin. A more potent argument in favour of benzole, however, is that, spelt without the final "e" it is objectionable, for it may cause confusion in that the -ol termination is properly reserved for the alcohol group—thus, phenol and not phenole. Benzol, however, has become something of a habit, it is universally spelt in this way in America, and we are of the opinion that the addition of the final "e" is mere unnecessary ornamentation. Perhaps, some of our readers will carry the matter a stage further by disagreeing with us, and advancing their reasons.

Sale Price of Sulphuric Acid

WITH regard to the rebate recently announced by the National Sulphuric Acid Association of 5s. per ton for acid sold for use in the manufacture of sulphate of ammonia a decided feeling has been expressed, especially in the North, that this differential rate should be abolished. We believe that the Council were disposed to take the same view, but at the same time that some concession, such as a higher price for spent oxide, should be made in place of the 5s. rebate. After full consideration of the circumstances we understand that it has been agreed that as the control on sulphate of ammonia will in all probability cease on May 31 next the local groups should be advised to adopt this date as the one from which the rebate would also cease. It has further been arranged, we understand, that the executive officers should have an interview with representatives of the National Gas Council and also, if considered advisable, with representatives of the Sulphate of Ammonia Association, with a view to having these suggestions carried out.

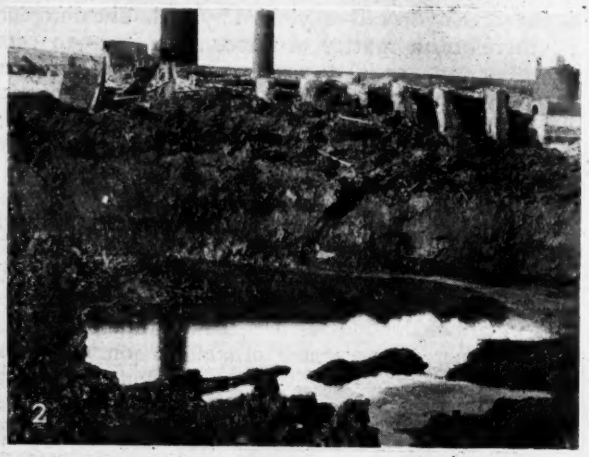
Chemists and Whitley Councils

FROM the tone of the interesting discussion on Whitley Councils at the Chemical Industry Club on Monday evening it would seem as if the chemists have not lost very much by not being represented on the Joint Industrial Council for the chemical trade. The rule that membership of such councils is to be limited to representatives of employers' associations and representatives of trade unions would in any event have restricted the representation to one body, the National Association of Industrial Chemists. But one gathers that the labour representatives will not even accept the registered trade union of chemists, any more than any other form of chemists' organisation. The chemists, as chemists, are therefore out of the industrial parliament. They occupy, according to one theory, the unhappy position between the upper millstone of capital and the nether millstone of labour, but the risk of this position, according to that irrepressible humorist, Dr. Ormandy, may not be wholly with the chemists; it might be awkward for the other two parties if the material between their millstones should turn out to be high explosive. For the present the chemists are apt to regard the Whitley Councils as a mere affair of £ s. d. between masters and men, and are disposed to look more to their own organisation. The bodies already in existence are necessarily to some extent rivals, but one may note with satisfaction the strong desire for unity which is springing up in all parties, and which, of course, is the essential condition precedent to any scheme of union or federation.

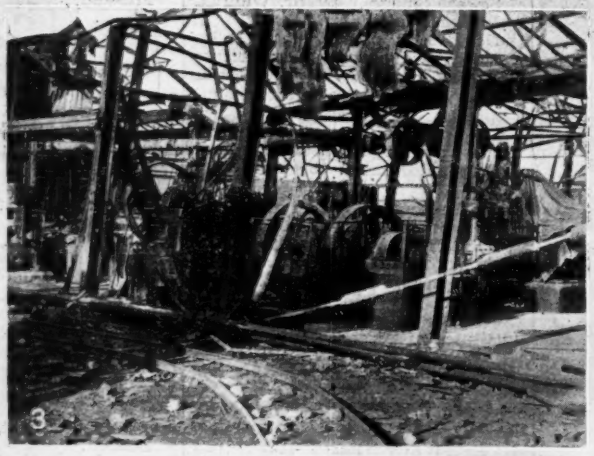
The Calendar

April		
8	Association of Engineering and Shipbuilding Draughtsmen (Chesterfield Sub Branch): "The Destructive Distillation of Coal." E. Nicholson. 7.30 p.m.	Grammar School, Chesterfield.
8	Optical Society. 7 30 p.m.	—
9	Society of Chemical Industry (Manchester Section): "Carbon Dioxide Recorders and their Application in Boiler Efficiency Control." B. A. Oldham. 7 p.m.	Grand Hotel, Manchester.
10	North of England Institute of Mining and Mechanical Engineers. 2 p.m.	Newcastle-on-Tyne.
12	Society of Chemical Industry (London Section): "The Fertilising Value of Sewage Sludges," by Dr. Winifred Brenchley and E. H. Richards. "A New Test for Incorporation," by Dr. E. P. Perman. "Experiments on Decrepitation," by T. Martin Lowry and L. P. McHatton. 8 p.m.	Chemical Society, Burlington House, Piccadilly, London
12	Royal Society of Arts: "Aluminium and its Alloys" (First Lecture). Dr W. Rosenhain. 8 p.m.	John Street, Adelphi, London.
13	Royal Photographic Society of Great Britain (Scientific Meeting): "Prisms." A. C. Banfield. "Machinery used in the Manufacture of Photographic Plates." A. J. Munro. 7 p.m.	35, Russell Square,. London.
13	Institute of Metals (Birmingham Local Section): Annual General Meeting and Dinner. 6.30 p.m.	Imperial Hotel, Birmingham.
13	Royal Institution of Great Britain: "Recent Advances in X-Ray Work" (First Lecture). Major G. W. C. Kaye. 3 p.m.	21, Albemarle Street,. London.
14	Society of Public Analysts: Papers by A. E. Parkes; Dr. A. F. Joseph and G. A. Freak; E. Sinkinson; Dr. G. W. Monier-Williams. 8 p.m.	Chemical Society,. Burlington House, Piccadilly, London.
15	Chemical Society. 8 p.m.	Burlington House, Piccadilly, London.
15	Society of Dyers and Colourists (Bradford Junior Branch): Paper by G. Sargent.	Bradford.
15	Institution of Mining and Metallurgy: Annual General Meeting. 5.30 p.m.	Geological Society, Burlington House, Piccadilly, London.
15	Royal Institution of Great Britain: "New Experimental Studies in the Liquid State (1), Ebullition and Evaporation." S. Skinner. 3 p.m.	21, Albemarle Street, London.
16	Royal Institution of Great Britain: "Ions and Nuclei." Professor J. A. McClelland. 9 p.m.	21, Albemarle Street, London.
17	Royal Institution of Great Britain: "The Thermionic Vacuum Tube as Detector, Amplifier and Generator of Electrical Oscillations." (First Lecture.) Dr. W. H. Eccles. 3 p.m.	21, Albemarle Street,. London.

Twisted Steel Girders and Uprights of a Large Building.



Crater after an Explosion.



Wrecked Machine Shop.

Heavy Cast Iron Digester lifted bodily across the Works.

A 4,000 Gallon Tank after a Journey through the Air.

Effect on Steel Chimneys.

Effects of Explosion in Chemical Factories

Described and Illustrated with Original Photographs

In view of recent serious explosions in chemical works in this country it may interest readers of THE CHEMICAL AGE to see some actual photographs of chemical plant after it had experienced the devastating influences of explosive force. We publish on the opposite page reproductions of six photographs taken by the author, which illustrate the extraordinary manner in which a sudden rush of irresistible forces over the works will select different portions of the plant and treat them in a way which demonstrates the mad uncertainty of the whole thing.

In the first photograph can be seen the remnants of a steel-girder constructed shop which has met with the full force of the explosion, but which has resisted in certain ways the attempt to dissociate the various portions of the structure. It will be noticed that the steel uprights in this particular building have not been torn from their foundations but have been bent over, although in some cases the uprights consisted of 6 in. or 8 in. H iron. It will also be seen that where the cross pieces were attached to the uprights they have not been disassociated, but the influences brought to bear upon these strong steel girders has tended to twist them into a series of unrecognisable shapes. It is, of course, mere conjecture, but one wonders how far the steel is influenced, not only by the force of the explosion, but also by heat. If the buckling which can be clearly seen in the picture is due to the influences of the explosion "cold," then it speaks highly for the strength of the steel girders. It would be more understandable, perhaps, if it could be conceived that in almost a momentary space of time the girders are heated to a considerable temperature and so forced to assume the shapes illustrated.

The photograph which looks rather like a rocky pool on the seashore (No. 2) is a very good illustration of the kind of crater that is often formed immediately beneath the main point of an explosion. This particular crater was fully 30 ft. deep, and the size of it in other directions can be readily imagined when it is realised that on this spot stood a shop containing large plant, the shop being some 30 ft. high and 100 ft. long.

Some idea of the immense force of the explosion which could entirely sweep away every remnant of the plant as well as the shop can be realised.

The selective quality of an explosion, due no doubt to certain influences beyond one's comprehenison, is well illustrated by the brick chimneys in the background. The large chimney on the left of the picture has in it a clearly defined crack. The one on the right was completely destroyed, but the centre chimney, which is of smaller diameter than the others was untouched. This was probably due to its greater elasticity. In another explosion one brick chimney was completely punctured by some substantial piece of flying iron work, but otherwise stood the shock. It is well known, of course, that a brick or any other chimney must give before pressure or break. Judging from these examples the "give" of a brick chimney must be even greater than is imagined or calculated.

Picture No. 3 shows all that was left of a machine shop which came under the influences of an explosion in a munition factory. The well-founded engines, and even the shafting have stood the strain, but it is curious to observe that although all the corrugated iron has been blown away, except a few dishevelled pieces flapping in a melancholy manner in any wind that blows, a wooden ladder leaning against one of the stout uprights is untouched!

The heavy cast-iron digestor (No. 4) was lifted bodily from its setting and thrown some 50 yards across the works. It probably weighed about 2 tons, but remained whole, not only when torn from its seating, but also when it crashed down through the other debris. There must have been on this spot a downfall of detached items of a most terrifying order.

Another and larger tank is shown in No. 5. This had a capacity of 4,000 gallons, was glass enamelled, and at the time of the explosion was full of liquor. Its total weight was in the neighbourhood of 14 tons, yet it was transported fully 40 ft., and no one will ever know what altitude it reached in its flight. One thing is certain—it could not have rolled into the position in which it was found. It will be observed that the connections were not small, and consequently by no means weak, yet they were torn like paper. The diameter of this tank was 10 ft.

How far steel chimneys supersede brick ones in strength, if at all, is largely a matter of theory. We have already shown the bases of three brick ones and the effect upon them. Here (No. 6) are the bases of three steel ones. The proportion of casualties is the same, namely, one down in three, but since the fallen steel one is down in one piece and the standing ones are still in good fettle, it may be assumed that on the whole the steel chimneys hold the better record.

From the point of view of the safety of inmates of buildings damaged by explosion, or of secondary damage generally it is, we believe, accepted that a building composed of material which will pulverise is preferable. This is hardly possible, however, in works. In observing the effects of several explosions in factories it would seem that a steel girder constructed building is less liable to general collapse than a brick one. While the sheeting surrounding it is invariably torn away it is more likely that the main structure will remain intact and usefully so. Naturally in the immediate vicinity of an explosion nothing can be expected to remain undamaged, but it is quite extraordinary how stoutly good plant will hold its own. In one explosion which occurred near the end of the war a row of large tanks built to withstand an internal pressure of 10 lb. to the square inch were untouched when the explosion occurred, and although nearly full of spirit stood up to their work and came through a devastating fire which followed unharmed. What internal pressure these hardy tanks reached at the hottest moment one cannot say, but it must have been many times greater than the alleged safety limit.

The policy of the Government constructors in isolating danger buildings as much as possible has been proved sound over and over again by the effects produced in such explosions as those referred to.

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MOLINARI'S CHEMISTRY. Vol. I., INORGANIC. Second Edition. London: J. & A. Churchill, 1920. Translated from the Fourth Italian Edition by Thomas A. Pope. £2. 2s. net.

This treatise is intended as a guide to students of chemical technology, and is divided into a general portion dealing mainly with chemical theory, and a special portion in which the elements and their compounds are studied in order, with special attention to technical processes, statistics and prices. There is little alteration in the general portion, and no mention is made of much recent work of importance, such as that on isotopic elements, Moseley's work on atomic numbers, and the Braggs work on crystal structure, and consequently this section remains the weaker portion of the volume.

In the special portion considerable new matter has been added on by-product and synthetic ammonia, and also on surface combustion, on Ostwald's process of ammonia oxidation, and on gas producers. Even so, insufficient space is devoted to the important subject of the utilisation of fuel; thus nothing is said of the application of powdered coal, otherwise than in cement kilns. No mention is made of Bucher's work on cyanide production and other similar modern developments.

The proofs might have been revised more carefully; for example, on page 451, "Coke is a hard spongy form of amorphus *coal*," whilst page 389 is headed "Mebel System." Prices are seldom given of later date than 1912, and therefore have little more than historical interest. In spite of blemishes, the work remains a useful survey of technical knowledge and should retain a wide sphere of usefulness as such. The theoretical portion is the least satisfactory, but many technical processes are excellently summarised, especially those which, for one reason or another, have reached a high stage of development in Italy.

E. F.

Atomic Weights and Atomic Numbers

By Dr. Stephen Miall

A MAN who has spent the greater part of his life in the toilsome profession of the law and who is now engaged in manufacture, cannot be expected to have a profound knowledge of physical chemistry, even if his brain is, once in a while, stimulated into activity by a bombardment of bodies heavier than electrons or α-particles. As an amateur, I am soon out of my depth in struggling with the constitution of the atom, but I very gladly adopt Professor Soddy's suggestion to publish a list of all the elements with their atomic weights calculated in accordance with the formula set out in my previous article.

Atomic No.	Element.	Formula $y=Mx+a$.	Calculated At. weight.	Atomic weight.
1	H	...	1·0	1·008
2	He	2×2	4·0	4·00
3	Li	$2\times3+1$	7·0	6·94
4	Gl	$2\times4+1$	9·0	9·1
5	B	$2\times5+1$	11·0	11·0
6	C	2×6	12·0	12·005
7	N	2×7	14·0	14·01
8	O	2×8	16·0	16·0
9	F	$2\times9+1$	19·0	19·0
10	Ne*	2×10	20·0	20·0*
	Ne*	$2\times10+2$	22·0	22·0*
11	Na	$2\times11+1$	23·0	23·00
12	Mg	2×12	24·0	24·32
13	Al	$2\times13+1$	27·0	27·1
14	Si	2×14	28·0	28·3
15	P	$2\times15+1$	31·0	31·04
16	S	2×16	32·0	32·06
17	Cl*	$2\times17+1$	35·0	35·0*
	Cl*	$2\times17+3$	37·0	37·0*
18	A	$2\times18+4$	40·0	39·88
19	K	$2\times19+1$	39·0	39·10
20	Ca	2×20	40·0	40·07
21	Sc	$2\times21+2$	44·0	44·1
22	Ti	$2\times22+4$	48·0	48·1
23	V	$2\times23+5$	51·0	51·0
24	Cr	$2\times24+4$	52·0	52·0
25	Mn	$2\times25+5$	55·0	54·93
26	Fe	$2\times26+4$	56·0	55·84
27	Co	$2\times27+5$	59·0	58·97
28	Ni	$2\times28+3$	59·0	58·68
29	Cu	$2\times29+5$	63·0	63·57
30	Zn	$58+2·5+5$	65·5	65·37
31	Ga	$58+2·5\times2+7$	70·0	69·9
32	Ge	$58+2·5\times3+7$	72·5	72·5
33	As	$58+2·5\times4+7$	75·0	74·96
34	Se	$58+2·5\times5+9$	79·5	79·2
35	Br	$58+2·5\times6+7$	80·0	79·92
36	Kr	$58+2·5\times7+7$	82·5	82·9
37	Rb	$58+2·5\times8+7$	85·0	85·45
38	Sr	$58+2·5\times9+7$	87·5	87·63
39	Y	$58+2·5\times10+6$	89·0	88·7
40	Zr	$58+2·5\times11+5$	90·5	90·6
41	Cb	$58+2·5\times12+5$	93·0	93·1
42	Mo	$58+2·5\times13+5$	95·5	96·0
43	...	$58+2·5\times14+$	...	...
44	Ru	$58+2·5\times15+6$	101·5	101·7
45	Rh	$58+2·5\times16+5$	103·0	102·9
46	Pd	$58+2·5\times17+6$	106·5	106·7
47	Ag	$58+2·5\times18+5$	108·0	107·88
48	Cd	$58+2·5\times19+7$	112·5	112·4
49	In	$58+2·5\times20+7$	115·0	114·8
50	Sn	$58+2·5\times21+8$	118·5	118·7
51	Sb	$58+2·5\times22+7$	120·0	120·2
52	Te	$58+2·5\times23+12$	127·5	127·5
53	I	$58+2·5\times24+9$	127·0	126·92
54	X	$58+2·5\times25+10$	130·5	130·2
55	Cs	$58+2·5\times26+10$	133·0	132·81
56	Ba	$58+2·5\times27+12$	137·5	137·37
57	La	$58+2·5\times28+11$	139·0	139·0
58	Ce	$58+2·5\times29+10$	140·5	140·25
59	Pr	$58+2·5\times30+8$	141·0	140·9
60	Nd	$58+2·5\times31+9$	144·5	144·3
61	...	$58+2·5\times32+$	...	...
62	Sa	$58+2·5\times33+10$	150·5	150·4
63	Eu	$58+2·5\times34+9$	152·0	152·0
64	Gd	$58+2·5\times35+12$	157·5	157·3
65	Tb	$58+2·5\times36+11$	159·0	159·2
66	Dy	$58+2·5\times37+12$	162·5	162·5
67	Ho	$58+2·5\times38+10$	163·0	163·5
68	Er	$58+2·5\times39+12$	167·5	167·7
69	Tm	$58+2·5\times40+10$	168·0	168·5
70	Yb	$58+2·5\times41+13$	173·5	173·5
71	Lu	$58+2·5\times42+12$	175·0	175·0
72	...	$58+2·5\times43+$	...	...
73	Ta	$58+2·5\times44+13$	181·0	181·5
74	W	$168+3+13$	184·0	184·0
75	...	$168+3\times2+$	...	...
76	Os	$168+3\times3+14$	191·0	190·9
77	Ir	$168+3\times4+13$	193·0	193·1
78	Pt	$168+3\times5+12$	195·0	195·2
79	Au	$168+3\times6+11$	197·0	197·2
80	Hg*	$168+3\times7+11$	200·0	200·6*
81	Tl	$168+3\times8+12$	204·0	204·0
82	Pb*	$168+3\times9+12$	207·0	207·2*
83	Bi	$168+3\times10+10$	208·0	208·0
84	AcA	$168+3\times11+13$	214·0	214·0
85	...	$168+3\times12+$	...	...
86	Th Em*	$168+3\times13+13$	220·0	220·0*
	Nt	$168+3\times13+15$	222·0	222·4
87	...	$168+3\times14+$	...	...
88	Ra*	$168+3\times15+13$	226·0	226·0*
89	Ac*	$168+3\times16+10$	226·0	226·0*
90	Io*	$168+3\times17+11$	230·0	230·0*
	Th	$168+3\times17+13$	232·0	232·4
91	Ux_2	$168+3\times18+$	...	...
92	U	$168+3\times19+13$	238·0	238·2

In the above list the elements marked with an asterisk, and some others, have been proved to be subject to the quality of isotopy, and if the formula used for calculating the above atomic weights is correct, some other instances should in time be discovered. Some of the elements do not agree at all well with the formula and in spite of this fact I think it has a germ of truth in it. Among the offenders one may notice copper with an atomic weight which should be a whole number but actually is 63·57, krypton which should end with 0·5, and is actually 82·9, molybdenum which should also end with 0·5, and is actually 96, and tantalum which should be a whole number, and actually is 181·5. On the other hand, we get a good line $y=Mx+7$, where the calculated and actual atomic weights are as follows :—

	Calculated.	Actual.
Ga	70·0	69·9
Ge	72·5	72·5
As	75·0	74·96
Br	80·0	79·92
Kr	82·5	82·9
Rb	85·0	85·45
Sr	87·5	87·63
Cd	112·5	112·4
In	115·0	114·8
Sb	120·	120·2

In the case of some of the rarer elements one is not sure that the atomic weights are known to an accuracy of 0·1 or even 0·2 per cent., but one cannot dismiss magnesium, silicon, copper and molybdenum in this summary fashion, and it will be most interesting if it should turn out that isotopes of these can be detected.

The properties of the inert gases indicate that "live" weight is capable of conversion into "dead" weight, that is to say, only one variety of matter is required, the difference between "live" weight and "dead" weight being due to position in the atom or some other such characteristic.

If we are driven to conclude that most of the elements have atomic weights which are integers increasing regularly by two units or possibly more for each place in the periodic table with a further increase of one or more units of "dead" weight, and that the matter of all elements is of only one variety, then we come back practically to Prout's hypothesis.

Since I wrote my Paper, the work of Mr. Aston, alluded to by Professor Soddy, has shown that neon, chlorine, krypton and some other elements are mixtures of isotopes with atomic weights which are whole numbers, and it now looks as if all atomic weights are of the form $2x+a$ where x is the atomic number and a an integer, but before writing definitely on this one must wait for Mr. Aston to publish the details of his most important experiments.

Colloidal Clay in Soap Manufacture

To the Editor of THE CHEMICAL AGE.

SIR,—In the issue of THE CHEMICAL AGE of January 17 I read with great interest the communications of Mr. Weston regarding the use of colloidal clay in soap and the experiments on the properties of clay. While appreciating the value of the experimental work done, the theoretical considerations and the claims to novelty set me reflecting, with regard to the boasted progress of scientific and technical knowledge, that it has required centuries of investigations and inventions, and all the new progress in physical and colloidal chemistry, to discover that clay possesses valuable fat-removing qualities —clay, the original detergent material before soap making was discovered, still the material used for this purpose!

Detergent clay is sold in Greece in small cubes and worked with water into a thick paste. This paste is applied on the oily stain upon wood or cloth in a thin layer and left to dry. During drying the oil is drawn by the clay; it is thus removed from the wood or cloth and taken away with the clay either by washing out as in the case of wood, or by rubbing off and brushing as in the case of cloth. This paste is also used as an efficient bath soap in sea water, the chemical soaps in our country being as a rule quite unsuitable. Nowadays the tyranny of the trade and its fashions have restricted this old use of clay, as there are every day offered new products imported from the scientific centres of progress and imposed upon the public as marked improvements. Thus every one in his turn must learn his lesson, and after the failure returns to his old approved efficient commodities. Would it not have been better simply to state that mixing with the soap some colloidal clay, or soapstone or soaproot, materials possessing detergent power, would not do any harm whatever and could not be considered as a sophistication? The mixing of soapstone (talcum) has been practised for many years in my country with no harm to the detergent power of the soap.

I would never have written the above remarks, and I would never have touched this question, trifling in itself, if it were not to refer to a tendency shown by the newer chemists to ignore all practical and long-established out-of-doors common knowledge. This is considered true knowledge only after some laboratory experiment is made, an experiment touching only one of the many sides of the phenomenon, which experiment is then explained and the explanation presented clothed with the fashionable garments of the season. Thus it seemed to Mr. Weston unworthy of a modern chemist to know the already known detergent properties of a claypaste, but he considered it necessary to make a laboratory experiment and present some numbers showing the surface tension of clay suspensions, to tell us that they are colloidal solutions and consequently possess adsorbing power in order to discover that clay has cleansing powers. These experiments ought to be presented as follows. "Because clay possesses known detergent power like soap it is interesting to know that when in a very fine suspension or in colloidal solution in water it lowers the surface tension of the water against air in a like manner as soap solutions do." Further, how do we know that "both (soap and clay in colloidal solution) have the power of adsorbing dirt, grease, &c., to a marked extent and both have thus detergent properties?" On the contrary, what we know is that they have detergent properties and that to explain these properties colloidal chemists say they possess adsorbing power.

This latter explanation is quite in accordance with the prevailing fashion, but it is an empty conception. Formerly the phenomenon of a body taking up another and removing it from its place was called *absorption*, without any assumption as to the causes and the internal mechanism of the phenomenon. Now the fashion alters the "b" into "d" and calls the same phenomenon adsorption, giving at the same time an explanation by the assumption that the removed body undergoes a local increase of concentration on the surface of the absorbing one.

Now for a powder and a gas or a dissolved substance this is at least conceivable, but how can we conceive it when we deal with liquids and solids? When we contemplate the removal of the oily stains from wood or cloth we have before our eyes a capillary phenomenon between two substances wetting each other and tending to increase their common surface. The water, when removing the clay, removes also the fat and grease with it. This mechanical action is common to a great many powdery materials, and every one can easily convince himself of the cleansing power of sea sand and river mud.

It is not my intention to discuss here the use of the term adsorption and show its weaknesses. I want only to point out that chemists ought to show a greater respect to out-of-doors well established practical knowledge based upon the attentive observation of facts and not think that the only scientific experimental knowledge is contained in the modern scientific books, or is gained in the chemical laboratories from small scale experiments which never represent the real course of the phenomenon in question. Generalisations based on explanations of such one-sided laboratory miniature and incomplete reproductions of the actual facts, although being really true speculations, are called true experimental knowledge. On the other hand, laws formed from a consideration of the actual practical processes viewed in their entirety, have often been named speculations. We have the best examples in the various theories on dyeing and tanning and the absorption phenomena as a whole, which have been baptised adsorption phenomena to get explained.

The case of the discovery of the known detergent properties of clay by laboratory experiments and the demonstration of the known effects by the assertion of the unknown and indefinite adsorbing power, is a pure *circulus viciosus* and ought to serve as a warning. Also that an article dealing with the use of clay in soap should begin with an introduction to colloidal chemistry and its wonders, instead of first stating the known use of clay as a detergent, characterise well the advertising and very little scientific road which this newest and yet undeveloped branch of chemistry is taking with many fatty words and very few clear conceptions, tending towards a chaos of mediæval alchemistic mystification.—Yours, &c.,

Athens, Greece, February 20, 1920. (DR.) P. D. ZACHARIAS, Chemical Engineer.

QUALITATIVE ANALYSIS IN THEORY AND PRACTICE. By P. W. Robertson, M.A., Ph.D., and D. H. Burleigh, A.R.C.S., D.I.C., B.Sc. Edward Arnold. Pp. 63. 4s. 6d. net.

Qualitative analysis as a means of teaching the fundamental principles of the chemistry of the metals does not hold that position that it merits; this is mainly due to the fact that the study of qualitative analysis usually resolves itself into the carrying out of a series of individual reactions of each metal and slavishly following a prescribed scheme of procedure irrespective of the principles involved. The authors have attempted to "try to make the student aware of the kind of reaction to be expected in any given case, which is equivalent to writing the equation, and understanding what that equation implies; in other words, we endeavour to eliminate the false antithesis of theory and practice. Then, having become cognisant of the different types of chemical reaction, the student is able to see how they are applied to the problems of systematic analysis." Whether the authors have succeeded in their attempt or not is open to doubt.

Chapter I. deals with Valency and Formulæ and will be a useful epitome to the student who has already mastered the elements of these subjects. Chapters II., III., IV. and V. treat of Chemical Reactions—Decomposition; Replacement; Double Decomposition and Oxidation and Reduction. The chapters would be of much greater value if they were illustrated with detailed practical exercises. Chapters VI. and VII. give the usual group separations and method of testing for acid radicles; the chief feature of these chapters are the "notes" explaining the various reactions used. Chapter VIII. gives simple outlines for testing for insoluble substances and alloys. One feature of the book is the series of questions at the end of each chapter. Chapter IX. gives an outline of the ionic theory and its application to analysis. In the hands of a capable teacher the book can be made to achieve the ends aimed at by the authors. F. E. W.

SIR THOMAS ROBINSON, M.P., Director of the Bradford Dyers' Association, is on the Committee appointed by the Government "to consider and advise as to the best means of securing the greatest possible production consistent with the permanent well-being of the industry and of the employers and workpeople engaged therein."

The Chemical Society

Presidential Address by Sir James Dobbie

ON Thursday, March 25, Sir James Dobbie, F.R.S., delivered his presidential address to the Chemical Society at Burlington House, London.

It was his privilege, he said, to address the Society for the first time as President in the year in which the war had been declared officially at an end. Whether the peace which we had achieved was to usher in a new era of greatness and prosperity for our country, or to mark the beginning of its decline, would depend upon the thoroughness with which we had learned the lessons of the great war and the way in which we were prepared to apply them. Among the most important of those lessons were those which concerned the dependence upon foreign countries of home industries which were vital to the State. The war had taught us that a sound national policy required us in future to produce, or to have the means of producing, within our own country many of the articles which formerly were obtained exclusively from abroad. From a general survey of our industries, it would be seen that they formed a highly complex system, in which certain products were essential to the manufacture of others. When these essential products ceased to be available, the industries dependent upon them were necessarily brought to a standstill. Industries which were in this way essential to others were now commonly known as "key" industries. There was a great danger when such industries were carried on exclusively abroad. The recognition by the Government that it is the duty of the State to intervene in such circumstances was, perhaps, one of the most significant and far-reaching consequences of the war so far as our industries were concerned. Many difficult and delicate economic questions would undoubtedly arise in the future in connection with key industries, and it was important that claims for their special treatment should only be put forward where some truly national interest was at stake.

Nitrogen Products Report

The publication of the report of the Nitrogen Products Committee of the Munitions Inventions Department had recently directed attention prominently to the group of industries concerned in the synthetic production of ammonia, nitric acid and other compounds of nitrogen. The report closed with the observation that, "as far as the United Kingdom is concerned, nitrogen fixation and allied processes will constitute a new 'key' industry." This observation was one of enormous importance to the country, and Sir James examined briefly the grounds on which it was based, and emphasised some of the lessons learned from the report.

Before the war there seemed to be no cause for anxiety with regard to the nitrogen question, as our production of ammonium sulphate was about five times the amount required for our own use. We depended for ammonia almost entirely on the by-products of the gas works and coke ovens, and for sodium nitrate on our imports from Chile; but as the war progressed the weakness of our position became apparent.

Sir James then outlined the measures adopted for the conservation of our stocks. The sodium nitrate that continued to reach us was increasingly demanded for the manufacture of munitions. For agricultural purposes ammonium sulphate was substituted, the surplus stocks of which were becoming more and more depleted by the growing requirements of the munition factories. Its exportation was restricted, and before the war ended the shortage was actually making itself felt.

The Nitrogen Products Committee was appointed in the early summer of 1916. One of its first steps was to examine the possibilities connected with the existing sources of supply. It therefore instituted an exhaustive inquiry into the conditions of the various industries in which ammonia was obtained as a by-product, and it was clearly established that, while a substantial increase of ammonia might ultimately be obtained from such sources, the immediate gain could not be great. No satisfactory method of obtaining ammonia from sources not hitherto utilised, such as peat and sewage, having yet been worked out, it was recognised that extensive investigation, probably extending over a long period, would have to be undertaken before the practicability of using them economically could be put to the proof. It therefore remained to inquire into the possibility, as a war measure, of installing one or other of the processes for the fixation of nitrogen which were in use on the Continent.

Although cyanamide had never been manufactured in this country, the working details of the process were easily procurable and the Committee felt justified in recommending it for adoption as one of the best suited to meet any shortage of ammonia that might occur during the war. This recommendation was at first adopted, but it was not acted upon. As the result of investigations carried out by a staff of chemists and physicists under the direction of Dr. J. A. Harker into the conditions of the manufacture of ammonia by the Haber process, the Committee recommended to the Ministry of Munitions in February, 1917, the erection of a trial plant. They were not then prepared to put forward proposals for the establishment of the Haber process on an industrial scale. In October, 1917, the Explosives Department of the Ministry of Munitions felt justified in recommending that this process should be adopted on the basis of a national factory, and the erection of the factory was in progress when the war ended. More successful experimental work had also been carried out on the oxidation process for the conversion of ammonia into nitric acid and ammonium nitrate, and it was proposed to include plant for this purpose in the national factory.

In a tribute to the work of the Committee, Sir James referred to the death of Dr. Harold Greenwood, who had charge from the beginning of the investigations on the synthetic ammonia problem, and whose exceptional ability and untiring energy had contributed so largely to the important results obtained.

The Position Summed Up

In a general summing up of the position, the President thought that the conclusion of the Committee that nitrogen fixation constituted a key industry was justified. Although our potential sources of by-product ammonia were undoubtedly very large, the practicability of making use of some of them had yet to be demonstrated, and the extent to which some of those which were known to be capable of utilisation could be made immediately available was very limited. On the other hand, although the processes for producing fixed nitrogen had not yet been established in this country, their installation could be quickly effected, and we should then be possessed of means of indefinitely increasing our nitrogen production. To ensure the safety of the country, however, it was sufficient, in the opinion of the Committee, that we should possess experience of the working of the fixation processes, and nucleus plant which would be capable of rapid extension.

Apart from the question of security in wartime, there were other reasons which rendered it important that the synthetic processes for the production of nitrogen compounds should be established in this country. The demand for combined nitrogen was greater now than before the war, and was certain to expand still further, due mainly to the increased requirements of agriculture.

The maintenance of our export trade was also of vital importance. In this connection it should be remembered that during the war Germany was manufacturing nitrogen products far in excess of her peace requirements, and that with the plant now set free she was probably in a position to compete with this country and with Chile. How far she would be able to do so successfully would depend on economic factors at present unknown. It was satisfactory to be able to state that one of the most important recommendations of the Committee was in a fair way of being acted on. It was generally understood that the national factory at Billingham-on-Tees, which was begun in 1918, was about to be acquired by a syndicate representing a large proportion of the heavy chemical trade of the country. Sir James understood that it was the intention to begin with a moderate sized synthetic plant, in which many of the details would represent notable improvements on existing German practice, and ultimately to develop this into a very large chemical project. In addition, the manufacture of nitric acid and nitrates by the oxidation process would form part of the scheme, and it would be possible to produce from this source a considerable part of the national requirements of nitric acid for commercial purposes. Such a combination of chemical interests opened up possibilities for the more economic production of ammonia by combining its manufacture with other industries in which the by-products of the Haber process could be utilised. Other developments could be looked for in connection with the disposal of the large quantity of oxygen resulting from the production of nitrogen, and this, again, might lead to the recovery of the rarer elements of the air which were now coming into demand for technical purposes.

It was important, not only that effect should be given to the specific recommendations of the Committee with regard to the established processes, but also that the researches begun during the war, and the processes still in the experimental stage, should be continued. It was satisfactory to learn that, while the technical staff engaged on the work of the Committee had been largely disbanded and the temporary research laboratories restored to their original purposes, the section of the staff engaged on the synthetic ammonia problem had been taken over by the syndicate referred to, and was continuing the investigation of some of the remaining problems. Moreover, although the Inventions Department of the Ministry of Munitions had ceased to exist, a small nucleus organisation had up to the present been retained, and was actively engaged in applying to the post-war situation the information and experience on the nitrogen problem collected by the Committee. Sir James added that at the present moment a number of important fixation schemes were in course of development, not only in the United Kingdom, but in many of our colonies, and some of those were receiving the active support of the Governments concerned.

The President called attention to our attitude towards the fixed nitrogen problem and such problems generally, and the importance of not overlooking developments in other countries, which in their results might be of vital importance to us as a nation. Where individual interests were not affected we were prone to be indifferent.

Statistics

In conclusion, the President pressed for the adoption of the Committee's recommendations that statistics of the nitrogen and

other industries of the United Kingdom should be officially collected and published. Very much valuable information could also be obtained by investigating conditions abroad. Was it too much to hope, he said, that some effective combination of the department concerned with the technical and scientific work of the nation might yet be devised for the purpose of keeping us in close touch with new developments abroad with which it was desirable in the interests of the state that we should be acquainted?

Sir W. Tilden, F.R.S., in proposing a vote of thanks to the President, referred to the arduous duties of the President of the Chemical Society at the present time, and congratulated the Society upon the fact that the presidential addresses were now of really practical and scientific interest. If the report of the Nitrogen Products Committee had any good results at all, one was that it had called the attention of the Government, and to a certain extent of the public, to the very great national importance of a knowledge of science. How far that attention would produce important practical results it was very difficult to say. The whole matter was one of education. We must create an intelligent public, and the public would never advance much in this direction until a profound change had taken place in the attitude of all the teaching bodies towards scientific instruction. We must distinguish between pure science and applied science. As the Chemical Society represented pure scientific interests, it was important that they should lay great emphasis on the national importance of pure science.

The vote of thanks was seconded by Dr. A. Scott and carried unanimously.

Election of Officers

The following officers and members of the Council were elected for the ensuing year:—

President, Sir James Dobbie. Vice-presidents (who have filled the office of president), Dr. H. E. Armstrong, Dr. A. C. Brown, Sir James Dewar, Dr. H. B. Dixon, Dr. P. F. Frankland, Mr. W. Odling, Dr. W. H. Perkin, Sir William J. Pope, Dr. A. Scott, Sir Edward Thorpe and Sir William A. Tilden. Vice-presidents (who have not filled the office of president), Dr. J. B. Cohen, Prof. F. G. Donnan, Dr. H. J. H. Fenton, Dr. S. Smiles, Prof. J. Walker and Dr. W. P. Wynne.

Treasurer: Dr. M. O. Forster.

Secretaries: Prof. J. C. Philip and Dr. H. R. Le Sueur.

Foreign Secretary: Dr. A. W. Crossley.

Members of Council: Dr. A. J. Allmand, Dr. E. F. Armstrong, Mr. J. L. Baker, Mr. F. H. Carr, Dr. A. Findlay, Dr. F. E. Francis, Mr. J. A. Gardner, Dr. J. M. Thomson, Dr. J. C. Irvine, Dr. C. A. Keane, Sir Robert Robertson and Mr. E. W. Voelcker.

Society of Dyers and Colourists

THE following officers and members of Council were elected at the annual meeting of the Society of Dyers and Colourists held at Huddersfield on Friday, March 26:—

President: Lord Moulton.

Vice-Presidents: Ernest Hickson; H. Sutcliffe Smith; Frank J. Farrell; Professor A. G. Green; Ernest T. Holdsworth.

Members of Council: H. Pomphrey; E. Fyleman; J. C. Oxley; R. Turner; F. Smith.

Hon. Treasurer: J. R. Denison.

Hon. Secretary: A. Silverwood.

Hon. Patent Secretary: W. P. Thompson.

Annual Dinner

There was a large attendance at the annual dinner the same night. Lord Moulton was unable to be present as chief guest owing to a political appointment, but Dr. Alfred Ree (Manchester) spoke as his deputy.

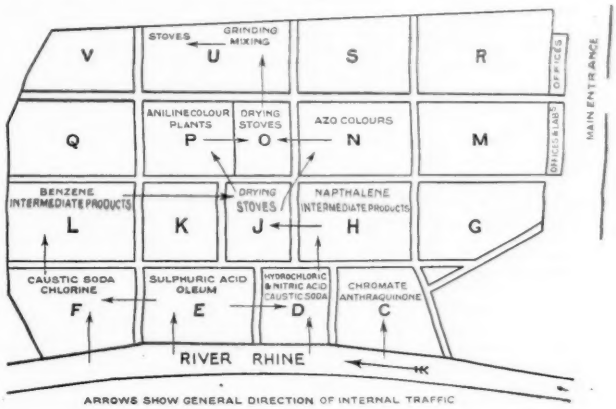
Mr. Charles F. Cross, F.R.S., the retiring president, occupied the chair, and amongst the guests present were Mr. J. Turner (Managing Director British Dyestuffs Corporation, Ltd.), Dr. Martin O. Forster (Prime Warden of the Worshipful Company of Dyers), Mr. T. Hirst (President of the Huddersfield Chamber of Commerce), Mr. W. D. Mackay, Leeds (Society of Chemical Industry), and Mr. C. Rawson (British Cotton and Wool Dyers' Association).

Dr. M. O. Forster, in proposing "The Society of Dyers and Colourists" said that the Society came into existence 36 years ago, when the first direct cotton dye was patented. He suggested that the society was the one to try and induce manufacturers to systematise the nomenclature of colours. This was a matter which was becoming a serious menace to the minds of those who were engaged in that particular kind of work. He urged that the Society should get manufacturers to agree upon some basic name for each individual colour.

Dr. Ree, in replying to the toast on behalf of Lord Moulton, mentioned that nearly 5,000 students were taking chemistry as their special subject, and expressed fear that there would not be employment for them. He hoped there might be, and probably they would be employed in positions in industry where chemists had not been previously employed, and where it would be advantageous for the industry.

Lay-out of German Chemical Works

THE following sketch taken from a recently issued pamphlet by the Association of British Chemical Manufacturers on the result of the British chemical mission to the Rhineland region of Germany, illustrates the lay-out of a German chemical works on the banks of the Rhine, and is an example of the great care devoted to this side of industry by German chemical firms:—



Electrolytic Alkali and Chlorine Industry

Mr. J. B. C. KERSHAW in his third and final lecture of this series at the Manchester College of Technology, on March 23, dealt with the progress of the industry in America. This industry dated from the year 1892, when the Le Sueur diaphragm cell and process was started at Rumford Falls. The Castner Electrolytic Alkali Company's works, using Castner's mercury cell, were established at Niagara Falls in 1898, using 2,000 h.p., and the Acker Process Co., followed in 1899, on a similar scale of operations, but employing the Acker fusion process, with molten-lead as cathode material, in place of mercury. The Acker Works were burned down after a few years' operation, and were not rebuilt. Since the year 1900 the development of the Electrolytic Alkali industry in America had proceeded steadily, the Dingley tariff upon imported heavy chemicals having helped to establish the home production of caustic alkali and bleaching powder upon a firm basis. In 1913, the estimated chlorine capacity of the electrolytic plants in America was 350 tons per day; this figure, however, included the paper making and other works, which decomposed salt or brine by electrolysis, but used the caustic alkali and chlorine in the course of their own business, and did not manufacture for sale. A very large number of plants of this type are now operating in U.S.A. and Canada.

The War gave an immense impetus to the American production of chlorine and of chlorine products by electrolysis, and there are stated to be over 50 companies operating in the United States and Canada to-day; the aggregate chlorine capacity of these plants being 550 tons per day. Taking one ton of chlorine as the equivalent of three tons of bleaching powder, this represents a production of nearly 500,000 tons of bleach per annum, or more than double that of the Le Blanc Works in this country in the palmy days of the industry.

The leading types of cell in use in America and Canada were then described, with the help of lantern slides. The last portion of the lecture was devoted to a discussion of the comparative current and energy efficiencies of the various cells used in Europe and America, and to a consideration of the effects produced by the design and material used for anodes and diaphrams, upon these efficiency results. A short discussion of the capital expenditure upon, and running costs of, typical water power installations in Europe and America closed the lecture.

The Affairs of G. E. Newton

AN adjourned sitting for the public examination of George Edward Newton, trading as G. E. Newton & Co., chemical merchant and exporter, 74, Great Tower-street, E.C., was appointed to be held at the London Bankruptcy Court on March 26. The debtor's statement of affairs showed gross liabilities £6,793 expected to rank for £2,030, and assets valued at £17 17s. 9d. When the case was called the Official Receiver complained that since the debtor had lodged his statement he had not troubled to attend, although he had been repeatedly requested to do so. The debtor, who was in Court, promised to attend on the Official Receiver at once, and the examination was adjourned to April 23.

Chemists and Whitley Councils

An Interesting Evening at the Chemical Industry Club

THE subject for discussion at the open monthly meeting of the Chemical Industry Club on Monday evening was the representation of chemists on Whitley Councils. Dr. Ormandy presided.

Mr. F. E. Hamer (editor of THE CHEMICAL AGE), in opening the discussion, said that the idea underlying the Whitley Council scheme of the joint and co-operative management of industry by all the parties engaged in it was accepted as good from every point of view. The scheme contemplated a Parliament for each industry, through which would be secured, not the predominance of this or that interest, to the exclusion of all the rest, but the best collective judgment and collective effort for the common good. The initial mistake was made, he suggested, when it was laid down that the membership of Whitley Councils was to be limited to the "two parties" to industry—capital and labour. In some of the simpler and more elementary industries the parties might for practical purposes be so resolved into two, but in the more highly developed industries, those which relied upon applied art or applied science, there were other bodies of workers equally, if not more, essential than the manual labourers—the artists and designers, the engineers, the chemists, the technologists, and so on. For this variety, unfortunately, no adequate provision had been made. Each Whitley Council was to consist solely of representatives of employers' associations and representatives of trade unions. The rigid decision that only registered trade unions should be recognised as representing the employed class; that not merely the unorganised workman should be unrepresented, but that all other forms of labour organisation should be refused recognition and disfranchised—this harsh and narrow interpretation had two inevitable consequences. (1) It must seriously weaken, especially in the more highly organised industries, the representative character of the joint council; (2) it gave the organised unions of manual labour an unfair preference and was a lever with which to force all other bodies into their camp. As a matter of fact, he believed that the Joint Industrial Council for the Chemical Trade had no representation of chemists at all; but, even if their claim were recognised, the only body qualified for membership on the present restricted basis would be the National Association of Industrial Chemists, not because it was more numerous or more influential and more representative of chemical interests, but simply because it bore the trade union label.

Apart altogether from the interests of rival bodies, this limited basis of membership was eliminating some of the finest objects of the Whitley Council idea. The first object was defined as "to secure the largest possible measure of joint action between employers and workpeople, and the improvement of the conditions of all engaged in the industry." It seemed pretty clear that they could not secure the largest measure of joint action when they deliberately excluded from participation all but one type of organisation; and even the greatest expert in legal casuistry would hardly argue that the term "all engaged in the industry" merely meant all engaged in the industry who happened to belong to a registered trade union.

Object 7, again, provided for the encouragement of the study of processes and design and of research. On the principle adopted, the artist who had specialised, say, in the study of historical furniture, and whose modern work carried on the high tradition of Chippendale, Sheraton and the rest, would have no voice in the control of the English furniture industry, because he happened to belong to the Design and Industries Association instead of to the Cabinet Makers' Federation, while the workman who carved his designs with the tool or turned them out by machinery like peas, would speak for the whole industry on the labour side. Or in the decorative textile industry, which depended supremely on design in form and colour, the weaver or the printer who merely put the artist's creations through the loom or through the press would be represented through his weavers' amalgamation, while the author of the design was himself ruled out. And in relation to chemical industry, the research chemist and the engineer, whose work constituted the very soul of the industry, would be allowed no voice unless they consented to join a trade union.

The effect of all this would be, not to secure the widest possible joint action, as originally contemplated, but to produce a lop-sided body, in which certain privileged interests were over-represented, and others, constituting, it might be, the majority in numbers and influence, would be deprived of all representation.

The remedy, it was light-heartedly said, was for all to become trade unionists; but people objected to being dragooned and regimented at the bidding of a new autocracy masquerading in the guise of liberty and democracy. Incidentally, the exclusion of the interests not covered by trade unionism was already having a cramping effect on the original purposes and ideals of the movement, for the liberalising influence which the more highly trained and educated workers would bring to bear was absent, and, instead of real parliaments of industry, the joint councils were degenerating—that, at least, was said to be the tendency—into cock-pits for fights over higher wages, shorter hours, and so on, while the finer and larger purposes were slowly disappearing from view. It seemed to him that the position might be summed up in four points:—

1. The idea of Joint Industrial Councils for the united and co-operative control of industry was, as an idea, entirely good.
2. The spirit in which the trade unions were interpreting and applying the scheme cramped and perverted the idea, and was eviscerating its essential principles and virtues.
3. To obtain the large and beneficial ends originally contemplated the basis of the Councils as at present constituted needed to be enlarged and liberalised, and effective provision made for the representation, not merely of one exclusive sect, but of all the classes and organised bodies on whom the success of an industry depends.
4. As regards a Council for the Chemical Industry, there can be no adequate representation of the chemical profession on a restricted trade union basis, but only on a fair proportional recognition of all existing bodies of chemists engaged in chemical industry.

Only on some such liberal basis can the organisation of our industries by means of trade parliaments be cleansed of its present sectarian and divisive spirit, and all engaged in industry be made to realise the essential unity which binds them all together.

In the discussion which followed part was taken by Mr. R. B. Pilcher (Institute of Chemistry), Mr. Charlier (president of the National Association of Industrial Chemists), Mr. Garland (British Association of Chemists), Mr. Stewart (technical manager of the United Alkali Co. and vice-president of the Joint Industrial Council for the chemical trade), Captain Goodwin and others. Perhaps the most frequently emphasised point was the need of closer unity among organisations of chemists. Incidentally, Mr. Coley mentioned that the membership of the club now exceeded 700. An extremely interesting evening closed with a vote of thanks to Mr. Hamer, proposed by Mr. Bernard Davis.

New Research Directorship

Important Appointment for Dr. A. W. Crossley

DR. A. W. CROSSLEY, C.M.G., Ph.D., D.Sc.(Vict.), F.R.S., who has been appointed First Director of Research to the newly established British Cotton Industry Research Association (Deansgate, Manchester), and who leaves London this week to take up his new duties, was Professor of Chemistry to the Pharmaceutical Society from 1904 to 1914; in the latter year he became second Professor of Chemistry at King's College, London, and in 1918 was appointed to the Daniell Chair, which he now vacates.

Dr. Crossley has an interesting war record. In November, 1915, he was appointed liaison officer for the Ministry of Munitions in all chemical subjects to the British and French forces in the field with the rank of lieutenant-colonel. He was in France in this capacity till June, 1916, when he became Commandant and Superintendent of Experiments at the Royal Engineers' experimental station at Porton, near Salisbury, where he carried out research relating to gas warfare. He returned to King's College last May and was appointed First Director of Research to the Cotton Research Association last November.

Last May or June the Department of Scientific and Industrial Research, in the course of a general scheme for the promotion of industrial research, approached certain prominent members of the cotton trade with a proposal for the formation of a research organisation. The proposal met with general assent, and a provisional scheme was suggested under which firms in the cotton trade are to become members on payment of a certain subscription, and the Department of Scientific and Industrial Research will contribute a considerable sum proportionately to the subscription amount.

"The Towers," a large mansion at Didsbury, has been bought. This will contain the Association's library, council room, general offices, and probably clubroom for the workers in the Institute. In the 13½ acres of grounds surrounding the house will be built the laboratories in which the research work will be carried out. An appeal is about to be issued for half a million pounds.

The appointment is referred to in our editorial notes.

Brunner Mond and Electro Bleach

IT was officially announced on Friday, March 26, that the proposed exchange of shares between Brunner, Mond, & Company and Electro Bleach and By-products had been ratified. It will be remembered that on February 27 the directors of Brunner, Mond offered to exchange one fully-paid ordinary share of £1 in their company, plus 8s. in cash for two preference shares of £1 each in Electro Bleach, and one fully-paid ordinary share of £1 in their company, plus 3s. in cash, for two ordinary shares of 10s. each in Electro Bleach. This offer was conditional on its being accepted by shareholders holding at least 75 per cent. of both preference and ordinary shares in Electro Bleach, and a time limit was imposed for acceptance, which expired on Wednesday last week. Shareholders holding over 95 per cent. of both classes of shares in Electro Bleach have accepted the proposed exchange, and in consequence the transaction will go through.

Society of Chemical Industry

Papers Before the Birmingham Section

THE annual election of members to the Committee of the Birmingham and Midland Section of the Society of Chemical Industry took place on Thursday, March 25. Prof. Morgan (University of Birmingham), Dr. Murray, and Messrs. Silvester, Rossiter and H. J. Alcock were elected to vacancies on the Committee.

Mr. F. R. O'Shaughnessy (hon. local secretary) reported that on Friday, April 23, a conference would take place at the Birmingham University Buildings on "Labour Saving Devices in Chemical Works." This had been arranged by the Chemical Engineering Group, and it was anticipated that the conference, which would be held in the afternoon and continued during the evening, would be of special interest. Exhibits would be shown in connection with the conference, and some American visitors were expected.

The subject of catalysis in relation to industrial operations, recently introduced before the Section by Dr. Maxted, of Walsall, was further considered at their mid-March meeting at the Birmingham University.

Catalysis Applied to Oil Hardening

Examples of catalysis applied to oil hardening were given by Mr. A. W. Knapp, B.Sc., F.I.C. (Cadbury's, Ltd.), who spoke of experiments made by him nine years ago. To-day there were 25 factories in Europe and the United States working at oil hardening, but he doubted if 10 years ago there were more than 25 workers engaged in research work. The remarkable advance made was an example of laboratory research leading to a great industry. It might be called "The Dream of the Soap Maker Come True." The soap maker had always been able to obtain cheap liquid oils, solid fats having been more costly, and it had long been the soap makers' desire to convert oils into fats. From the theoretical standpoint it looked simple to convert the liquid oleic acid into the solid stearic acid (the former being the candlemakers' by-product). All that it was necessary to do was to persuade a molecule of the unsaturated oleic acid to take up a molecule of hydrogen. Methods were suggested, but they were cumbrous and unsatisfactory. The work of Sabatier and Senderens showed the possibility of using nickel as a catalyst for this reaction, and for the last 15 years the work had consisted of finding the method of obtaining a catalyst in its most active form and working out the most suitable apparatus for effective contact.

Mr. Knapp said he had made a few experiments with platinum and palladium, founded on the researches of Paal and Roth (1911). They found that if a solution of colloidal platinum or palladium were made into an emulsion with fat with the help of gum-arabic, and hydrogen passed through, that the hydrogen was absorbed and the fatty matter hardened. Owing to its unsuitability for commercial application, a great improvement was effected when they suggested the precipitation of the metal on some inert substance, and the placing of this direct in the fat. He used solutions of platinum dichloride and palladium dichloride, and he tried precipitating those metals or their hydrates on light magnesia. They were poor catalysts, and he abandoned them for precipitating on magnesium itself. He found that if platinum or palladium asbestos were put in a dilute solution of permanganate that it could be readily reduced by bubbling hydrogen through it, and it was possible to get some idea, by the time required in the reduction of the colour, as to the activity of the asbestos. The ordinary nickel catalyst, however, appeared incapable of accelerating this reduction, and this was also true of the magnesia catalysts. In the preparation of the palladium catalyst he used 1,000 parts of water, 100 parts of magnesium and one part of palladium as palladium dichloride. When powdered magnesium was mixed with water no obvious action occurred; but on the addition of the palladium dichloride a brisk evolution of hydrogen began. The temperature rose until the water boiled, and a considerable quantity of oxide of magnesia was formed. The hydrogen formed was frequently spontaneously ignited by the particles of palladiumised magnesium on the surface of the bubble. It was evident that this method of preparation of the catalyst on a large scale might present some danger, and he found it well to keep the water cool and to wash with alcohol and then with ether.

As to oils, it was important that they should be clean. Old oils or freshly pressed oils could sometimes be improved by heating above the temperature required for the catalyst, allowing to cool and then filtered. The effect of heating was apparently to coagulate some of the colloidal matter which otherwise would be deposited on the catalyst. Complaints had been made that the soaps prepared from hardened oils, whilst hard and economical, did not lather freely. When one considered that the soap produced would be sodium stearate that was easily understood; but it was readily overcome in practice by limiting the proportion of hardened oil used in the preparation of any soap. Mr. Knapp commented on the fact that large quantities of hardened fats were used for edible purposes, and he thought it was time that some statement was made as to the quantity that the public was absorbing, because, although a good deal of work had been done, he thought that the wholesomeness was still open to question. Hardened oils kept, however, remarkably well, and kept free from rancidity. He had been surprised that no cocoa-butter substitute, consisting of hardened oil, had been offered for sale, considering that the price of cocoa butter was 2s. 11d. per lb. wholesale.

The Oxidation of Cellulose

The contribution of Mr. L. P. Wilson, of Coventry (Courtaulds', Ltd.), was on "Catalytic Action in the Oxidation of Cellulose." He pointed out that in the manufacture of artificial cellulose fibres from cellulose the most commonly employed method was the viscous process, in which cellulose xanthate was produced and dissolved in dilute alkali to form a solution. This solution was projected through fine apertures into a coagulating medium, and so was formed into filaments. The first stage in the production of a solution, whether the starting material were wood or cotton, was the formation of alkali cellulose by immersion in a strong solution of caustic soda of over 15 per cent. strength. That caused a partial gelatinisation of the fibres, and the formation of a definite chemical compound, which, after a process of oxidation and subsequent reaction with carbon bisulphide, formed sodium cellulose xanthate, a brownish plastic solid, which was soluble in water, forming a liquid of high viscosity. Whether or not the cellulose xanthate would form a solution which could be used for the production of threads depended largely on the exact amount of oxidising action to which the alkali cellulose was submitted; that was, in any case, very small, but it caused an alteration in the molecular arrangement of the cellulose, and determined whether the xanthate when mixed with water was a stiff gel or a liquid less viscous than glycerin. The chemical difference between those two conditions could not be stated, but the physical differences were most marked. This oxidation had been generally effected by exposure to the atmosphere, and, at the ordinary temperature (say 20°C.), the process might take four days. If oxygen were introduced by other means, such as by treatment with peroxides or hypochlorite, that time might be reduced in proportion to the activity of the oxidising agent employed. One per cent. of sodium peroxide added to the caustic soda solution, used to produce the alkali cellulose, resulted in a sufficient oxidation taking place during a steeping period of about five hours. Whichever method of oxidation was employed—either exposing to air after the formation of alkali cellulose or oxidising while still in the caustic soda solution, the process could be greatly accelerated by the use of suitable catalysts. These catalysts were generally oxides or hydrates of metals, which exist in two states of oxidation. For example, iron, nickel, cobalt, cerium, vanadium and manganese. The catalyst was applied either by first impregnating the cellulose with a salt of the nickel, or by suspending the hydrated oxide in a fine state of division in the caustic soda solution. Lead, although not an oxidising catalyst when used by itself, acted as a catalytic accelerator in conjunction with manganese.

The Dehydration of Milk

Col. J. G. Wright, of Toronto, read a Paper on the dehydration of milk, showing recent developments in America in the production of milk powder.

It was not until recent years that a commercially successful process had been brought out for extracting only the solids of milk without the addition of foreign ingredients, and rendering it capable of being reconstituted into a fluid more or less closely resembling the original milk. Two processes had been in general use since 1902, when considerable improvement was made. As a result of a recent discovery by Dr. Dick, of Minneapolis, U.S.A., of what was known as the economic process, it was now possible to ship 12 pounds of milk powder from Canada reconstituted by the addition of 88 lb. of water, and to do anything with that reconstituted milk that could be done with milk as it came from the cow. It could be used for ordinary domestic purposes, and the cream would rise, or it could be separated, and butter or cheese could be made in the usual proportions. Col. Wright then explained several methods of production of milk powder, and handed round samples of newly reconstituted milk for examination by the chemists present.

Estimation of Carbon Dioxide & Fermentible Sugars

Dr. Arthur Slater, in a Paper on this subject, said the apparatus consisted of a distillation flask connected to a condenser; a large trap prevented spray and froth being carried over during the distillation of carbon dioxide from the flask to the "assay" flask, which contained standard bargta water. A test tube to which had been sealed a piece of glass tubing could be connected to the side piece by means of pressure tubing, and the whole apparatus could be evacuated through a stop cock. The estimation of carbon dioxide in sodium carbonate was carried out in the following manner:—25 c.c. M 10 sodium carbonate was placed in the flask, and the test tube was filled with dilute sulphuric acid. Into the "assay" flask was introduced 30 c.c. M10 bargta water. The apparatus was exhausted, a screw clip being placed on the pressure tubing to prevent the acid in the test tube passing into the distillation flask. The acid in the test tube was warmed and boiled into the flask. Both flask and test tube were well boiled and the "assay" flask shaken

to absorb the gas. When the distillation was complete, air, free from carbon dioxide, was allowed to enter the apparatus through the stop cock. The excess of bargta in the turbid solution in the "assay" flask was then titrated with standard hydrochloric acid using phenolphthalein as an indicator. Previous tests made by titrating bargta water containing a suspension of barium carbonate showed that rather more standard acid was required to change the bright pink colour to a faint pink than was necessary when no carbonate was present. In those estimations that correction was added to the apparent amount of alkali neutralised by the carbon dioxide. Special precautions were necessary if volatile acids other than carbon dioxide were present, and if insoluble salts were present care had to be taken that all the carbonate was acted upon by the acid; but in most cases the method acted satisfactorily. The estimation of sugars by alcoholic fermentation offered possibilities of interest. If the fermentation reaction could be put on a quantitative basis it should be possible to estimate sugars and mixtures of certain sugars and other carbohydrates without any appeal to the optical activity or to the reducing properties of the sugar. The fall in reducing power or the change in optical activity after complete fermentation measured the amount of sugar present. The idea was to extend the use of pure cultures of yeasts and employ the fermentation reaction itself to estimate the sugar.

Chemists and War Service

Profession Well Represented in New Honours List

THE official list, published on Tuesday, of promotions in and appointments to the Order of the British Empire made by the King in recognition of services rendered in connection with the war, includes the following:—

KNIGHTS COMMANDERS.

George Henry Ashdown, C.B.E., I.S.O., Director of Stores, Admiralty, and Admiralty Representative on International Petroleum Committee.

Robert Waley Cohen, Petroleum Adviser to the War Office.

Frederick Larkins Macleod, C.B.E., Adviser on Foreign Iron Ores, Ministry of Munitions.

Alfred Mansfield, C.B.E., Director of Oils and Fats, Ministry of Food.

Joseph Turner, J.P., Managing Director, British Dyes, Ltd.

COMMANDERS.

Douglas Heriot Baird, Chairman and Managing Director, Messrs. Baird & Tatlock (London), Ltd., Chairman and President, British Chemical Ware Manufacturers' Association.

Ralph Martin Bewick, Director, United Alkali Co., Ltd. (Chemical Manufacturers).

John Charles Burnham, C.S.I., Superintendent, H.M. Factory, Gretna, Ministry of Munitions.

Charles Claude Carpenter, D.Sc., Member Chemical Warfare Committee and Munitions Inventions Panel, Ministry of Munitions; Chairman, South Metropolitan Gas Co.

Francis Howard Carr, Chief Chemist, Messrs. Boots' Pure DrugStores

Lieut.-Col. George Lawson Chambers, Official Consignor for Board of Trade, Dyes Department.

Frederic Horton Clough, late Representative of Director of Experiments and Research in the Department of Torpedoes and Mining, Admiralty.

Frederick George Donnan, F.R.S., Member, Munitions Inventions Panel and Chemical Warfare Committee, Ministry of Munitions; Professor of General Chemistry, University College, London.

Frank Emil Fehr, President of the London Oil and Tallow Trades Association; Assistant Director of Oil and Oilseeds Supply, Ministry of Food.

Percy Faraday Frankland, F.R.S., LL.D., Sc.D., Deputy Inspector of High Explosives, Birmingham Area, Ministry of Munitions; Emeritus Professor of Chemistry, Birmingham University.

James Colquhoun Irvine, Ph.D., D.Sc., F.R.S., Associate Member Chemical Warfare Research Committee, Ministry of Munitions; Professor of Chemistry, University of St. Andrews.

William Macnab, Technical Adviser, Factories Branch, Explosives Department, Ministry of Munitions.

Stephen Manuel, in charge of section of Raw Materials Department responsible for control and supply of Light Leathers, and Adviser on East Indian Tanned Hides and Skins.

George Stubbs, O.B.E., Superintending Analyst, Government Laboratory; Vice-President, Institute of Chemi try.

Desborough, Capt. Arthur Peregrine Henry, Superintendent of R.N. Cordite Factory, Holton Heath.

Lowry, Thomas Martin, Esq., O.B.E., D.Sc., F.R.S., Associate Member, Ordnance Committee, Ministry of Munitions.

Woolcock, William James Uglow, Esq., O.B.E., M.P., Chairman of Medical Stores Committee, War Office. (General M nager of the Association of British Chemical Manufacturers).

OFFICERS.

George Edward Alexander, Director, United Glass Bottle Manufacturers, Ltd.; Chairman, Associati n of Bottle Manufacturers of Great Britain and Ireland.

Harold James Bailey, Technical Adviser, Acids Section, Explosives Supply Department, Ministry of Munitions.

William Robb Barclay, Technical Adviser, Non-Ferrous Materials Supply Department, Ministry of Munitions.

William John Bowis, Ph.D., Director, Messrs. Boots' Pure Drug Stores, Ltd.

Ernest Bury, Managing Director, Skinningrove Iron Co., Ltd.

John Walton Capstick, D.Sc., valuable services in organising the work of the Admiralty Physical Laboratory.

Edgar Reginald Deacon, M.B.E., Research Chemist, Research Department, Royal Arsenal, Woolwich.

William Porter Dreaper, Superintendent, H.M. Factory, Ellesmere Port, Ministry of Munitions.

Charles Vickery Drysdale, D.Sc., Chief Research Assistant, Admiralty Experimental Station, Parkston.

Edward Victor Evans, M.B.E., Chief Chemist, South Metropolitan Gas Co.

Major Sidney Ferner, M.C., Assistant Director in Charge of the Distribution of Oil and Fat Compounds, Ministry of Food.

John Jacob Fox., M.B.E., D.Sc., First Class Analyst, Department of the Government Chemist.

Peter Frank, M.B.E., Chief Engineer, Messrs. Kynoch, Ltd.

William Howleson Gibson, M.B.E., Temporary Principal Assistant to Superintending Chemist, Research Department, Royal Arsenal, Woolwich.

William Briggs Gill, Legal Adviser to Director of Oils and Fats, Ministry of Food.

John Charles Willis Humfray, Chief Analyst of Inspector of Steel's Permanent Staff, in charge of Sheffield Laboratory.

Henry Johnson, General Manager, Messrs. Courtaulds, Ltd.

Frederick William Jones, Chemist and Consulting Expert on Explosives, Small Arms Ammunition Department, Ministry of Munitions.

John Moncrieff, Chairman and Managing Director, North British Glass Works and Harbour Works, Perth.

Gilbert Thomas Morgan, D.Sc., F.R.S., Chemical Warfare Department, Ministry of Munitions; Professor of Chemistry, Technical College, Finsbury.

James Eckersley Myers, D.Sc., Voluntary Research Worker, Chemical Warfare Department, Ministry of Munitions; Lecturer in Chemistry, Manchester University.

William James O'Donovan, M.D., M.R.C.P., Chief Medical Adviser on Prevention of T.N.T. Poisoning, Ministry of Munitions.

George Henry Perry, M.B.E., Director of Chemical Division, Inspection Department, Ministry of Munitions.

Robert Pike, Manager, Filling Factory, Messrs. Sir W. G. Armstrong, Whitworth & Co., Ltd.

Richard Bertram Pilcher, Adviser to Optical Munitions, Glassware and Potash Department, Ministry of Munitions; Registrar and Secretary, Institute of Chemistry.

Frederick Custance Sellers, General Director, Vacuum Oil Co., Lisbon.

Charles Simmonds, First-Class Analyst, Department of Government Chemist.

Robert Whytlaw Whytlaw-Gray, Ph.D., Chemical Warfare Department, Ministry of Munitions.

Aluminium Welding Patents

IN the Chancery Division last week, before Mr. Justice Sargent, the hearing of the action by the Aktien Gesellschaft für Autogene Aluminium Schweissung against the London Aluminium Co., Ltd., of Birmingham, for an injunction respecting aluminium welding fluxes was completed. (*See* THE CHEMICAL AGE, March 13, 20 and 27, pp. 281, 317 and 327.)

Mr. Colefax replied on the whole case for the plaintiffs.

His Lordship said one thing had been puzzling him. Evidence had been given that Mr. Restall, who conducted welding operations for the plaintiffs, used a much smaller quantity of flux than an ordinary aluminium welder did. He asked if that was the natural consequence of using a flux which melted at a higher temperature.

Mr. Hunter Gray, K.C., for the defendants, said he thought that was a matter upon which evidence would have to be given, and he was afraid that there was not any.

Mr. Colefax referred to the fact that the plaintiffs had two patents and the question whether or not an injunction upon the second would meet the case, presuming that his lordship decided in their favour.

His Lordship said he was only thinking whether, from the point of view of the defendants, it really made much difference.

Mr. Colefax said the plaintiffs' position and also the defendants' was that they stood or fell on one or both patents.

His Lordship said there were cases where it might make very much difference in fact.

Mr. Colefax said that they did not accept for one moment the view that had been expressed that a perfectly good flux could not be made taking alkali chlorides alone. He dealt with the evidence for the defendants at some length.

His Lordship said he would consider his decision.

Chemical Matters in Parliament

British Cellulose Co.

Mr. Alfred Davies (Clitheroe) asked the Parliamentary Secretary to the Ministry of Munitions (House of Commons, March 26) if the contemplated profits stated in the prospectus of the British Cellulose & Chemical Manufacturing (Parent) Co., Ltd., were realised, namely, that the earnings of that company should be sufficient to pay to the preference shareholders an additional 9 per cent. over and above the 7½ per cent. to which they had cumulative rights; and what would be the percentage returns to the vendors of the shares of the original British Cellulose & Chemical Manufacturing Co. on the cash which they put into that company?

Mr. J. Hope: The percentage returns to the vendors of the shares of the original British Cellulose & Chemical Manufacturing Co. on the cash which they put into that company can only be calculated after it is known the amount of dividend payable on the ordinary shares of the British Cellulose & Chemical Manufacturing (Parent) Co., Ltd., and I have no information as to what this dividend is likely to be.

Mr. Sitch asked the Parliamentary Secretary to the Ministry of Munitions (House of Commons, March 29) what was the precise sum in cash put into the British Cellulose & Chemical Manufacturing Co. by way of share capital at its inception and subsequently; and what shares, distinguishing preference and ordinary, in the new British Cellulose & Chemical Manufacturing (Parent) Co., Ltd., would be received by the shareholders in the former company in consideration of the sale to the new company of the share capital of the former company?

Mr. Hope: With regard to the first part of the question, I would refer the hon. Member to the Report of the British Cellulose Committee under Lord Sumner's chairmanship of last year.

With regard to the second part of the question, the hon. Member is evidently under a misapprehension. All the shares (except one) in the British Cellulose & Chemical Manufacturing Co., Ltd., are already owned by the British Cellulose & Chemical Manufacturing (Parent) Co., Ltd., and have been so owned since March, 1918.

Mr. Cautley asked (House of Commons, March 30) whether outside brokers were advertising £1 ordinary shares of the British Cellulose (Parent) Co. for sale at 35s. each, as being at this price likely to return to the buyer 28 per cent.; whether the ordinary shares were mainly held by the directors and their friends, and how much cash was paid into the original company for what was now represented by a £1 ordinary share?

Mr. Hope, in reply, said he had no knowledge as to the first part of the question, and referred his hon. friend to the report of Lord Sumner's committee of last year for full financial history of both companies.

Petrol Profiteering Sub-Committee

Mr. Atkey asked the Under-Secretary of State for Foreign Affairs (House of Commons, March 29) whether his attention had been drawn to the statement in the Report of the Profiteering Sub-Committee on Petrol and other motor fuels that grossly excessive profits were being made in connection with the import of petrol; whether he would state the price at which the Anglo-Persian Oil Company was selling its petrol for importation; and whether he would give the name of the company to which the Anglo-Persian Oil Company's petrol is sold?

Sir Hamar Greenwood: My attention has been drawn to this Report which is now, I understand, under consideration by the Board of Trade. With reference to the second and third parts of the question, the Anglo-Persian Oil Company's output of petrol is at present sold under contract to the Royal Dutch Shell Group. I am unable to state the price ruling under the contract.

Hides from Russia and Germany

Mr. Bridgeman, in reply to Mr. Waterson (House of Commons, March 29), stated that the quantities of hides (other than leather) imported into the United Kingdom, consigned from Russia and Germany in 1913, were 164,000 cwt. from Russia and 45,000 cwt. from Germany. There are no restrictions on the importation of hides from Germany. The arrangements with regard to trade with Russia are at present under consideration.

Government Assistance in Sugar Beet Industry

Major Barnes asked the Prime Minister (House of Commons, March 29) whether the arrangement made by the Government with Home-grown Sugar, Ltd., to guarantee dividends during the period of development and then to sell the Government shares at par if so required, embodied the settled policy of the Government with regard to private enterprise; and whether that policy was for the State to undertake the risks attaching to the development of industries and, when they had arrived at a profitable stage, to allow the profits to accrue to private interests?

Mr. Chamberlain: The arrangement made is a very special one, the object of which is to promote by an experiment on a commercial scale, of which the Government takes part of the risk, the establishment of the sugar beet industry in this country. I hope that cases where Government assistance is required will not be frequent. Each case must be judged on its merits, but as a general rule I should be disposed to agree with the hon. and gallant Member that it should take a proportionate share of the profits.

Anglo-Persian Oil Co.

In reply to Mr. Waterson (House of Commons, March 24), Mr. Chamberlain said the acquisition of controlling interests in the Anglo-Persian Oil Co. was authorised by the Anglo-Persian Oil Company (Acquisition of Capital) Act, 1914, and the Anglo-Persian Oil Co. (Acquisition of Capital) Amendment Act, 1919. The Government holding is the nominal sum of £5,200,000 in the form of ordinary and preference shares and debenture stock, of which £4,250,000 is paid up. No call on the balance can be made without the consent of the Treasury.

Destruction of Roumanian Oilfields

In the King's Bench Division, on Saturday, Mr. Justice Darling delivered judgment on the petition of right in which the Roumanian Consolidated Oilfields, Limited, claimed £1,255,513 from the British Government for the destruction of their property in the course of the war. The suppliants alleged that under an agreement which was made between them and Colonel Sir John Norton-Griffiths, as representative of the Government, they were entitled to compensation. The reply of the Crown was that it became necessary to destroy the oilfields to prevent them from falling into the hands of the enemy, and that the Government merely undertook to put forward to the Roumanian Government any claim for compensation.

His Lordship said that Colonel Sir John Norton-Griffiths himself practically destroyed the property before ever the Roumanian Commission had agreed to the destruction taking place. The Roumanian Government had nothing to do with it. He found that the petitioners had proved that Colonel Norton-Griffiths did promise them compensation, and that on that promise they allowed him to destroy their property.

It was agreed that the petitioners should have judgment as to liability in their favour, with costs, and that the question of the reference to assess the compensation should be left with Sir Edward Carson and the Attorney-General.

Chemical Exhibits at Glasgow

The following chemical firms were among the exhibitors at the Scottish Bakers' and Grocers' Exhibition at the Kelvin Hall of Industries at Glasgow. The exhibition was promoted by the Glasgow Corporation under the auspices of the Scottish Association of Master Bakers:—

The United Kingdom Chemical Co. (Glasgow) exhibited a selection of home-made dyes in all the fashionable colours; while the other chemical preparations shown included rat killers, antiseptic cleaners, soap powders, &c.

The Lyon Essence & Chemical Co. (Brighton) showed a large variety of harmless colours and chemicals for foodstuffs, ice-cream powders, &c.; while essences and flavours for sugar boilers and manufacturing chemists, as well as for cake makers and pastry cooks, were also featured on this stand.

John Poynter, Son & Macdonalds (Glasgow) had a well-arranged display of carbonite of ammonia; ivory black for de-colourising; and acids and chemicals of all descriptions both for the home and the export market.

Peden & Reid (Carntyne), Westmuir Oil & Chemical Works, showed a wide range of specialities which included sundries of particular interest to bakers; while motor-car and machinery oils were also prominently featured.

The Fletcher Chemical Co. (Glasgow) displayed their manufactures in the direction of all kinds of essences and colours for the baking and confectionery trade; while "Tartacid" cream (a substitute for cream of tartar) was also on display.

Perry & Hope, Ltd. (Nitshill), had a wide range of cream of tartar substitutes, tartaric acid substitutes; packed "Snocreme" in tins to take the place of cream of tartar; and pure phosphoric acid for aerated water manufacturers.

The Milroy Chemical Co. (Glasgow) displayed various sundries for the baking and confectionery trades, including all forms and of egg products, essential oils, essences and colours, and bread improvers.

From Cairo to the Cape

Our colleague, Major C. C. Turner, the editor of *Aeronautics*, one of Benn Brothers' publications, concludes in the current issue of that journal his thrilling narrative of the attempted flight from Cairo to the Cape. Major Turner, who represented the *Daily Telegraph*, was one of the occupants of the Handley Page machine which crashed near Shereik, and he tells the story with a happy combination of imagination with a faculty for exact description of facts. Here, for example, is a typical little passage showing that the writer has eyes for more than appears on the surface:—

"The desert is the playground of the winds. The wind builds up hills and lays them flat. It blows now hither, now thither. Here it lifts up the sand in great clouds that darken the sun. There it pours down the blessed rain. And the sand drinks up the rain, and laughs. That is how we found the desert in our first two days' flight."

From Week to Week

IT IS ANNOUNCED that in the coming financial year the Government assistance to the dye-making industry will be reduced to £400,000, as against £1,500,000 in 1919-20.

MR. J. S. MACARTHUR, whose death took place recently, will always be remembered in connection with the Forrest MacArthur patent for the extraction of gold from its ores by means of cyanide. The initial work in connection with the extraction of gold was carried out with small funds in a laboratory which was in reality a cellar at the back of a Glasgow tenement house. After this work was completed, Mr. MacArthur engaged in many commercial ventures in connection with chemistry and mining, but, with the possible exception of his last, none of them seemed to possess the elements of permanent success. This was the extraction of radium from its ores, which he carried on first of all in Cheshire, and then practically on the shores of Loch Lomond, in order to avail himself of the purest possible water.

PARKE, DAVIS & CO., manufacturing chemists, Hounslow, and T. W. Beach & Sons, Ltd., Preserve Works, Brentford, have informed the officer commanding the 8th Batt. Middlesex Regt. that they are prepared to offer the following facilities to their employees who join the new Territorial Army to the extent of 10 per cent. of their male adult staff: (1) Time to attend full 15 days' camp for men who have one week as holiday. During the first week they would draw their full pay, during the second week the difference between their Army pay and their civilian pay would be made up by the firm. In the case of men with more than one week's holiday an arrangement on similar lines would be made. (2) Time to attend musketry course, which might involve an occasional week-day afternoon off. This would be granted on the written application of the Adjutant only. (3) If called up for service after discharge the men would be taken back on their job again.

IN THE CURRENT NUMBER of *The Bulletin of the Imperial Institute*, the possibility is discussed of utilising the mowra flowers of India for the purposes of manufacturing alcohol for use as motor spirit. These flowers possess thick, juicy petals, rich in sugar, and are used by the natives as a foodstuff and especially for the preparation by fermentation of an alcoholic liquor called daru or mahwa spirit. During the war the flowers were used in India for the production of acetone, the yield being said to be ten times as much as that obtained by distilling wood. It has been estimated that in the Hyderabad State alone there are already sufficient mowra trees for the production of 700,000 gallons of proof spirit per annum, in addition to that necessary for the local liquor requirements. A report prepared for the Nizam of Hyderabad states that the total cost of preparing the flowers and transporting them to the factory amounts to £1. 10s. per ton.

THE REPORT of the Mission sent out to Germany by the Association of British Chemical Manufacturers in May last year states that at the Leverkusen works of Friedrich Bayer & Company, seven miles north of Cologne, there are numerous departmental and one central laboratory, a library containing over 50,000 volumes and 60,000 dissertations, together with complete sets of every journal dealing with pure, applied, textile and pharmaceutical chemistry in all languages. Current journals on these subjects are obtained from every country of the world; these are all abstracted, and the abstracts filed for reference. The abstracting of current journals is not done by the library staff, but by translators from the commercial section. Arrangements exist with booksellers all over the world to send in to the library all books dealing with chemical subjects. It is interesting to note that books and journals published during the war reached the library regularly through various channels; thus, a book on vegetable dyes not generally known, published in Great Britain, was received in the library in the year in which it was published—viz., 1917.

IN CONSEQUENCE of suggestions that lighter cylinders might be used for compressed gases the Department of Scientific and Industrial Research formed a Gas Cylinders Committee in 1918, consisting of Professor H. C. A. Carpenter (chairman), Professor C. V. Boys, Professor E. G. Coker, Dr. J. A. Harker, Major Cooper-Key, Professor F. C. Lea, Eng. Capt. J. McLaurin, Sir Charles Parsons, Major C. J. Stewart, and Professor J. F. Thorpe. Compressed gases were much used during the war for various purposes, such as supplying oxygen for airmen flying at high altitudes and for poison-gas warfare. Industrially also, there has been an immense development in the use of oxygen and acetylene for welding, of carbon dioxide and ammonia for refrigeration, of hydrogen for ballooning, &c., which no doubt will be maintained. Arising from the necessity of war, very light cylinders have been manufactured for the purposes above mentioned, and slightly heavier cylinders were made to an Admiralty specification. The Gas Cylinders Committee, in conjunction with the leading tube manufacturers, has made a number of tests of cylinders based upon these war specifications, and it is hoped that as a result of this work it may be possible to recommend the adoption of cylinders considerably lighter than those now in general use.

Chemical Curiosities of the War

THE annual meeting of the Bristol and South Wales section of the Society of Chemical Industry was held on March 25 at the University, Mr. Walls in the chair.

The following officers and committee were elected for the next session:—Chairman: Ernest Walls; Vice-Chairman: C. M. Thompson, M.A., D.Sc.; Hon. Secretary: F. W. Rixon, M.Sc., Ph.D., F.I.C. Committee: C. E. Boucher, B.Sc., T. H. Butler, M.Sc., Ph.D., F.I.C., W. J. Cooper, F.I.C., F. E. Francis, D.Sc., Ph.D., F.I.C., W. R. Bird, M. W. Jones, C. J. Waterfall, F.I.C., H. E. Cox, M.Sc., F.I.C., Hon. Sec. S. Wales Sub-Committee, J. H. Duncan, V. F. Eberle, M.A., R. Robertson, J. Bernard, Hon. Treasurer.

Following the business meeting, Professor Francis gave an account of "Some Chemical Curiosities of the War." In 1860, he pointed out, spectroscopic investigation detected a new line in the solar spectrum. Lockyer and Frankland called the element that gave rise to the line Helium, in 1882 the same line was noticed in the eruption of Vesuvius, in 1898 Ramsay investigating gases evolved on heating minerals found a new gas given off by a mineral called Cleevite, which, on examination, showed the characteristic line of Helium. The story goes that Ramsay, tiring of the monotonous similarity of the products of his experiments, placed the vessel containing this gas in a mixed assortment of apparatus; the laboratory attendant clearing up was instructed to throw the whole of the collection away, but as an after-thought told to retain that particular tube, in which subsequently Ramsay discovered Helium. This gas, so rare that it had escaped discovery up to this date, a portion of which, say the fraction of a cubic inch, would be regarded as a treasure, was nevertheless suggested by the Admiralty as a material for filling balloons in place of hydrogen, over which it possesses considerable advantages. It was known to occur to the extent of about 1 per cent. in the natural gases of Texas, when the Armistice came 180,000 cubic feet were awaiting shipment from the United States, who have now prohibited the export of this gas. Another gas—Argon—forming about 1 per cent. of the atmosphere, is now in use for filling electric globes, the filaments behaving much better in this gas than others. Both gases owe their value to their negative character and lack of reactivity. The reasons given by the Germans for the use of noxious gases were, first a shortage of high explosives, second the failure in effectiveness of bombardment in trench warfare; these reasons given were probably correct, but there were others, notably the desire to effect a considerable surprise. The materials used were varied and their production followed lines most unexpected, but it seems almost humourous to strain every nerve to discover substances which will make the enemy either weep or sneeze. A sneeze does not appear to be deadly, but it resulted in the removal of the gas mask when the more deadly fumes did their work. Much of the chemical production of a new type, explosives, detonators, and the intermediate materials such as sulphuric acid were made by the aid of catalysts, those strange chemical stimulants of which platinum is a very important type, and we were very lucky to obtain half a ton of this stuff from Petrograd. The queerest substances and most peculiar reactions have been employed for various purposes. Titanium and silicon chlorides for smoke screens. Glycerin made from sugar. Acetone from calcium carbide, and as the result of the essentially chemical war, Germany has lost her most valuable chemical assets, her phosphatic iron deposits which constituted 70 per cent. of her iron ores and her monopoly of potassium compounds.

In the discussion Mr. Walls remarked that the discovery of the chemist as the keystone of commerce was a war discovery, also the fact that no research, however apparently abstruse, could be said to be without practical value. Other contributions to the discussion were made by Messrs. Boorne, Came and Dyke-Acland, also Drs. Butler and Rixon. The meetings of the section will be resumed on the second Thursday in October. All local chemists and manufacturers having chemical interests should join the section, which has a membership of over 200.

No Nitrate Bids

IT is reported that no bids were made in Valparaiso or London at the Association's sale by tender on Wednesday, March 24, of 400,000 tons of nitrate, July-December shipment, at minimum prices of 16s. 9d. to 17s. 6d. per quintal, f.a.s., Chile. Henry Bath & Son state that since March 16 a few second-hand sales of July-December were reported from Chile at 16s. 6d., and on this side some prompt ordinary realised 15s. 10½d. Nearest closing quotations are about 16s. to 15s. 10½d. for April-June and 16s. 4½d. to 16s. 1½d. for July-December shipment. The last quotation for 1921 was about 14s. 9d., sellers, but no mention has been made lately. Continental retail demand is momentarily quiet, but expected to improve. Distribution in Holland has been seriously impeded for some weeks by dock strikes.

A later message states that the British firm, Anthony Gibbs & Sons, has offered to buy, with certain options, one million tons of nitrate.

References to Current Literature

Only articles of general as distinct from specialised interest are included and given in alphabetical order under each geographical subdivision. By publishing this digest within two or three days of publication or receipt we hope to save our readers time and trouble; in return we invite their suggestions and criticisms. The original journals may be consulted at the Patent Office or Chemical Society's libraries. A list of journals and standard abbreviations used appeared in our issue of December 27 last.

British

CHLOROFORM. Note on a sample of chloroform from coke-oven gas. A. J. Dey. *Pharm. J.*, March 27, 303-304. The sample was prepared from alcohol produced at Skinningrove.

COMBUSTION. Lecture experiment upon combustion. A Price. *Chem. News*, March 26, 149-150. An experiment to illustrate "gas caps."

GAS. Influence of impurities in gas on the corrosion of meters and the blockage of service pipes. A. R. Myhill. *Gas World*, March 27, 265.

PERFUMES. A dictionary of odoriferous substances. T. H. Durrans. *Perf. & Essent. Oil Rec.*, March, 79-81. This second instalment (see CHEM. AGE, 1920, 258) deals with hydro-carbons and aliphatic alcohols.

TOBACCO. Nicotine and tobacco smoking. N. Asherson. *Chem News*, March 26, 150-151. Experiments on the combustion of cigarettes are described.

TRAINING. Industrial training. J. Currie. *J. Roy. Soc. Arts*, March 26, 299-310. An account of some of the work done by the Ministry of Labour.

Colonial

EVAPORATOR. A laboratory vacuum film evaporator. H. E Watson. *J. Ind. Inst. Sci.*, Vol. II., Part 14, 209-212.

OIL. Note on the oil from compressed oil gas. J. C. Mansukhani and J. J. Sudborough. *J. Ind. Inst. Sci.*, Vol. II., Part 6, 73-77.

WOOD. Wood distillation. H. E. Watson and J. J. Sudborough. *J. Ind. Inst. Sci.*, Vol. II., Part 7, 79-106. A general account of the industry.

Distillation of some South Indian woods. H. E. Watson, J. J. Sudborough and K. S. Dheerende. *J. Ind. Inst. Sci.*, Vol. II., Part 7, 107-119.

French

ANALYSIS. Combustion of organic compounds containing chlorine by the sulphochromic mixture. J. Guyot and L. J. Simon. *Comptes Rend.*, March 22, 734-736.

SEWAGE. The formation of activated sludge. F. Diénert. *Comptes Rend.*, March 22, 762-763.

United States

ACETONE. Losses incurred in the preparation of acetone by the distillation of acetate of lime. L. F. Goodwin and E. T. Sterne. *J. Ind. Eng. Chem.*, March 1, 240-243.

AMMONIA. An electrically heated bomb for ammonia synthesis. R. O. E. Davis and H. Bryan. *J. Ind. Eng. Chem.*, March 1, 287-288.

Purification of compressed gases in testing catalysts for ammonia synthesis. R. O. E. Davis. *J. Ind. Eng. Chem.*, March 1, 289-290.

ANALYSIS. Determination of cellulose in woods. W. H. Dore. *J. Ind. Eng. Chem.*, March 1, 264-269.

A rapid accurate method for the analysis of an iron ore. E. Little and W. L. Hult. *J. Ind. Eng. Chem.*, March 1, 269-273.

Indicators and their industrial applications. H. A. Lubs. *J. Ind. Eng. Chem.*, March 1, 273-274.

The De Roode perchloric acid method of determining potash. T. E. Keitt. *J. Ind. Eng. Chem.*, March 1, 276-277.

An electric heater for the coal-tar naphtha distillation test. J. B. Hill and R. B. Chillas. *J. Ind. Eng. Chem.*, March 1, 280-281.

The Macmichael torsional viscosimeter. W. H. Herschel. *J. Ind. Eng. Chem.*, March 1, 282-286.

ARSENIC. The preparation of arsenic trichloride from white arsenic and phosgene. L. H. Milligan, W. A. Baude and H. G. Boyd. *J. Ind. Eng. Chem.*, March 1, 221-223. The use of catalysts in the process is described.

BENZENE. Catalytic oxidation. I. Benzene. J. M. Weiss and C. R. Downs. *J. Ind. Eng. Chem.*, March 1, 228-232. The conditions of formation of quinone and maleic acid have been investigated.

CARBON MONOXIDE. The removal of carbon monoxide from air. A. B. Lamb, W. C. Bray and J. C. W. Frazer. *J. Ind. Eng. Chem.*, March 1, 213-221. An account of investigations at the American University Experiment Station.

CHARCOAL. Charcoal before the war. W. D. Bancroft. *J. Phys. Chem.*, February, 127-146. A discussion of the principal literature.

CO-OPERATION. The Technology Plan. W. H. Walker. *Chem. & Met. Eng.*, March 10, 463-464. An outline of a scheme to effect closer co-operation between scientific and industrial effort.

COPPER. The requirements of refined copper. L. Addicks. *Chem. & Met. Eng.*, March 10, 449-453. An account of the various properties demanded of this product.

COTTON OIL. Pictorial description of the cotton oil industry. D. Wesson. *Chem. & Met. Eng.*, March 10, 465-472. An illustrated article showing the various stages of manufacture.

ELECTRIC FURNACE. Step induction regulator for electric furnaces. P. B. Short. *Amer. Electrochem. Soc.*, April 10, advance copy, 8 pp. A description of recent developments in electric control equipment.

EMULSIONS. Experiments on emulsions. II. T. R. Briggs. *J. Phys. Chem.*, February, 120-126. Experiments on the preparation of emulsions by shaking are described.

Experiments on emulsions. III. T. R. Briggs, F. R. Du Cassé and L. H. Clark. *J. Phys. Chem.*, February, 147-160. This Paper deals with pharmaceutical emulsions.

EXPLOSIVES. The stability of tetryl. C. L. Knowles. *J. Ind. Eng. Chem.*, March 1, 246-248.

The manufacture of trinitroxylene for use as a substitute for TNT in bursting charges for high explosive shells. J. Marshall. *J. Ind. Eng. Chem.*, March 1, 248-250.

FUEL. Motor fuels. E. W. Dean. *J. Franklin Inst.*, March, 269-302. An account of the production, marketing and testing of motor spirits.

GAS. Preventing accidents in gas plants. J. F. Conner. *Chem. & Met. Eng.*, March 3, 421. A Paper read before the Safety Congress of the National Safety Council.

HYDROGEN. The generation of hydrogen by the reaction between ferrosilicon and a solution of sodium hydroxide. E. R. Weaver. *J. Ind. Eng. Chem.*, March 1, 232-240. A careful study of the process has been made.

MINERALS. Bismutoplagionite—a new mineral. E. V. Shannon. *Amer. J. Sci.*, March, 166-168. A new lead bismuth sulphide is described.

NITROGEN. Political and commercial control of the nitrogen resources of the world. I. C. G. Gilbert. *Chem. & Met. Eng.*, March 10, 443-448. A general review of the sources of nitrogen.

Theoretical study of nitrogen fixation by the electric arc. C P. Steinmetz. *Chem. & Met. Eng.*, March 3 and 10, 411-416, 455-462. Concluding parts of Paper already noted (CHEM. AGE, 1920, 258-284), dealing with the kinetics of the process.

PHENOL. The manufacture of phenol in a continuous high-pressure autoclave. K. Brown. *J. Ind. Eng. Chem.*, March 1, 279-280.

POTASSIUM NITRATE. Potassium nitrate from the Chilian nitrate industry. P. F. Holstein. *J. Ind. Eng. Chem.*, March 1, 290-293.

PUMPING. Pumping acids by compressed air. J. Oliphant. *Chem. & Met. Eng.*, March 3, 408-410. The compound lifts at U.S. nitrate plants are described.

SPAIN. The chemical indnstry and trade of Spain. O. P. Hopkins. *J. Ind. Eng. Chem.*, March 1, 223-227.

STEEL. The effect of nitrogen on steel. G. F. Comstock and W. E. Ruder. *Chem. & Met. Eng.*, March 3, 399-405. The literature is reviewed and some experiments described.

Explosion hazard in steel mills from partly consumed coal dust. *Chem. & Met. Eng.*, March 3, 422-423. An account of some work by L. D. Tracy of the U.S. Bureau of Mines.

German

FUEL. Gaseous fuels in 1917-1919. W. Bertelsmann. *Chem. Zeit.*, March 13 and 16, 217-219, 221-223. A continuation of the review already noted (CHEM. AGE, 1920, 284).

PIGMENTS. Lead chromate. L. Bock. *Farben-Zeit.*, January 31, 761-762.

POTASH. The development of the potash mines in Upper Alsace. E. Kohl. *Gluckauf*, March 13, 205-209. An interesting account of the deposits.

STEEL. The direct connection of electric steel furnaces to public electricity works. E. F. Russ. *Elektrotechn. Zeits.*, January 15, 45-48.

VARNISHES. Solvents and the nature of varnishes. H. Wolff. *Farben-Zeit.*, January 17, 668-671. The influence of different solvents on the properties of varnishes is discussed.

Miscellaneous

EXPLOSIVES. The use of military explosives for industrial and agricultural purposes. G. Gariboldi. *Giorn. Chim. Ind.*, January, 10-22.

SULPHURIC ACID. The evolution of the chamber process. A. Aita. *Giorn. Chim. Ind.*, January, 1-8.

Patent Literature

We publish each week a list of selected complete specifications accepted as and when they are actually printed and on sale. In addition, we give abstracts within a week of the specifications being obtainable. Readers can thus decide what specifications are of sufficient interest to warrant purchase, the only way of obtaining complete information. A list of International Convention specifications open to inspection before acceptance is added, and abstracts are given as soon as possible.

Abstracts of Complete Specifications

109,813. INULIN FROM PLANTS, PROCESS FOR OBTAINING. A. Daniel, Mommsenstrasse 55, Charlottenburg, Germany. Application date, September 18, 1917.

The sap which is pressed from vegetable roots is heated with an excess of sodium carbonate to about 80°C. The quantity of sodium carbonate is such that no further precipitation occurs when it is added to the filtered sap, and albuminous matters, &c., are thus eliminated. Other alkali carbonates or hydroxides, or alkaline earth hydroxides, may alternatively be used. The inulin is crystallised out from the purified sap, and may subsequently be converted into levulose.

117,605. MORTAR-FORMING MATERIAL FROM ANHYDRITE, PROCESS FOR THE MANUFACTURE OF. F. Hartner, 8, Hölderlinweg, Bad Homburg v.d. Höhe, Germany. International Convention date (Germany), July 18, 1917.

Anhydrous gypsum or anhydrite may be converted into a mortar-forming material by grinding it with alkaline substances such as alkali oxides or hydroxides, or preferably calcium or magnesium oxide, or calcium hydrate or magnesium hydroxide, in the proportion of 2·5 to 5 per cent. Alternatively, Portland cement, slag cements, dead burnt lime, or waste building materials containing lime may be used.

123,716. EVAPORATION OF WATER FROM AQUEOUS LIQUIDS. Aktiengesellschaft Kummler & Matter, Aarau, Switzerland. International Convention date (Switzerland), February 26, 1918.

In an apparatus for concentrating lye or other liquids, the steam generated by heating the liquid is passed to a rotary compressor which raises its pressure and consequently its temperature. Part of the steam from the compressor is passed through a pipe coil immersed in the lye and the remainder is introduced into the liquid by means of open steam jets. By this means the liquid is kept in circulation and deposit of solids on the heating pipe is prevented.

125,946. METHYL ALCOHOL, MANUFACTURE OF. J. A. Christiansen, Polytechnic Academy, Copenhagen. International Convention date (Denmark), April 20, 1918.

Methyl formate is first produced by condensing carbon monoxide and methyl alcohol at high pressure in the presence of sodium methylate containing some methyl alcohol, or by passing carbon monoxide into a solution of sodium methylate in methyl alcohol. The methyl formate produced is then hydrogenised by means of a catalyst such as reduced cuprous oxide, when two molecules of methyl alcohol are produced for each molecule of methyl formate. The reaction may be carried out at atmospheric pressure and at a temperature of 180°-200°C., but the reaction proceeds more rapidly at higher pressures. By this process it is possible to produce unlimited quantities of alcohol from the constituents of water gas.

139,229. FINE ORES, IRON FILINGS, FLUE DUST, PURPLE ORE AND THE LIKE, PROCESSES FOR SOLIDIFYING CONGLOMERATES OF. C. Giesecke, 12A, Westring, Bad Harzburg, Brunswick, Germany. Application date, October 4, 1916.

The fine ore or other material is charged into a shaft furnace in the form of briquettes or bricks made by a press, and mixed with a finely divided fuel, such as coke dust. The burning is so controlled that the sintering zone is close to the upper surface of the charge, and the briquettes pass rapidly through the pre-heating, sintering and cooling zones, so that the sintering does not extend to the core of the briquettes and a conglomerate is produced in which the masses have a well-sintered crust and a less sintered and easily reducible core. The product is well suited for treatment in a blast furnace.

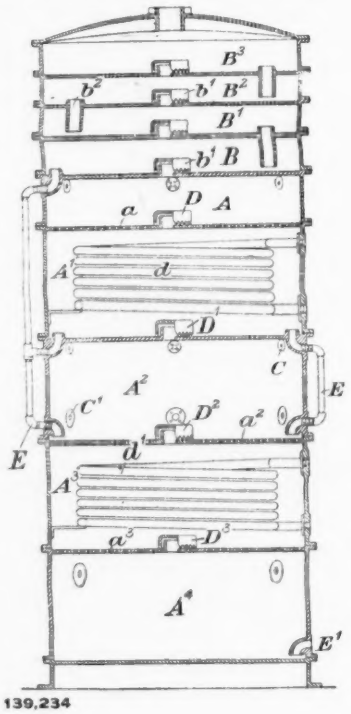
139,232. CELLULOSE ACETATES, PROCESS FOR THE MANUFACTURE AND PRODUCTION OF. J. O. Zdanowich, 24, St. James's Street, London, S.W.1. Application dates, April 8 and September 18, 1918.

A mixture of acetic anhydride, glacial acetic acid, and cellulose is treated at a temperature up to 70° or 80°C. with chlorine gas or bromine, and the resulting halogen acetic acid in its nascent state re-acts effectively with the cellulose. After the reaction has proceeded for about two hours, the esterification is completed by the addition of a small quantity of sulphuric or chlorosulphonic acid. The hydrolysing effect of the halogen varies with the temperature, the time, and the amount of halogen. The cellulose acetate soluble in chloroform, acetone, and the like, which is produced when the action of the halogen is interrupted before its completion, may be further hydrolysed by adding hydrogen peroxide or formaldehyde to the acetylating mixture.

139,233. REFINING LIQUID HYDROCARBONS. A. E. Dunstan, Meadhurst, Cadbury Road, Sunbury-on-Thames. Application date, June 3, 1918.

Liquid hydrocarbons such as benzene, kerosene, or other distillates from petroleum, shale oil, and the like, are first analysed to find their sulphur content, and then treated in an electrolytic cell with sodium or other alkali hypochlorite in such amount as to provide one unit of oxygen for each unit of sulphur. A small amount of free alkali should be present, and the mixture is stirred and heated to 120°F. The sulphur compounds in the oil are thus oxidised to substances which pass into and are removed with the lye. When the oxidised sulphur compounds are relatively insoluble in the oil they may be removed by filtration through animal charcoal, dehydrated alumina, fuller's earth, or other decolorising agent.

139,234. SULPHONATION, NITRATION AND CHLORINATION OF AROMATIC SUBSTANCES, APPARATUS APPLICABLE FOR.



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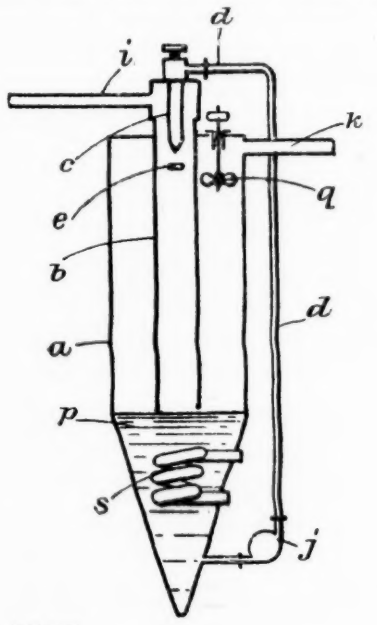
H. N. Morris & Co., Ltd., and H. N. Morris, Norfolk Street, Manchester. Application date, June 5, 1918.

The apparatus is for treating aromatic substances such as benzol, toluol, or phenol, with sulphuric acid, chlorine, &c. The aromatic substance and sulphuric acid or liquid chlorine are introduced into the mixing chambers A, A^2, by atomisers C, C′ at intervals, and the liquids flow down through the perforated partitions *a*, a^2, a^3, and pipes E to the chamber A^4. The temperature is maintained in the chambers A′ and A^3 by means of heating or cooling coils *d* and *d′*. Central valves D, D′, D^2 and D^3 are provided for the upward passage of vapour. The vapour rises into the superposed condensing chambers B, B′, B^2, B^3, which are provided with communicating valves *b′* for the vapour, and with short pipes b^2 to allow the liquid to descend. The final product is withdrawn from the chamber A^4 by the outlet E′. If necessary, a suitable catalyst, such as iron, may be placed in the chambers A′ and A^3. The apparatus is suitable for the manufacture of intermediate products for dyes.

139,237. Scrubbers, Saturators and Similar Apparatus. P. Poore, 1/4, Paternoster Row, London, E.C. Application date, November 20, 1918.

The apparatus is more particularly for the recovery of acetic acid as acetate of lime direct from the hot retort vapours in the destructive distillation of wood and similar substances. In the diagrammatic illustration shown, the vapour enters by the pipe *i*, and washing liquor is forced by a pump *j* through a



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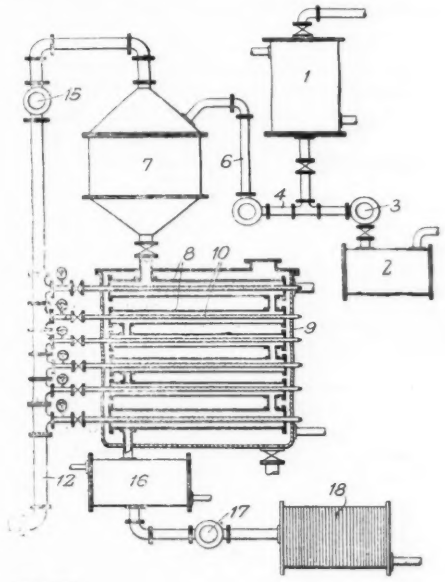
pipe *d* to a vertical nozzle *c*, the outlet of which is arranged just above a baffle plate *e*. The absorption of the vapour is effected in the tube *b*, the lower end of which opens just above the liquor *p*. The temperature of the liquor is maintained by a steam coil *s* and the liquor returns to the pump *j*. The vapour passes from the casing *a* to the outlet *k*, and the rotating fan *q* prevents the passage of froth to the outlet pipe.

139,239. Hydrogenating Oils, Method of and Process for. G. Martin, The Co-operative Wholesale Society, Ltd., 109, Corporation Street, Manchester. Application date, November 27, 1918.

The apparatus is of the kind described in Specification 129,461. (*See* The Chemical Age, Vol. I., page 256). The oil, liquid fat, wax, or the like, is passed through a preheater 1, and a further quantity of the same oil is mixed with a catalysing agent and also preheated in the tank 2. The oil is forced by a pump 3 through a pipe 4, and the mixture passes through a pipe 6 to a reservoir 7. The oil then passes to a set of pipes 8 in series, which are heated by steam in the casing 9. The oil is impregnated with hydrogen which is supplied from a main 12 to a set of perforated pipes 10 passing concentrically through the pipes 8. The hydrogenated oil passes into a cooler 16, and



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is then forced by a pump 17 through a filter press or centrifugal machine 18 to remove the catalyst. The escaping hydrogen passes into the reservoir 7 from which it is withdrawn by the pump 15 and returned to the pipes 10.

139,263. Coal Tar Hydrocarbons and other Like Matters, Fractional Distillation Plant for. W. E. Edwards, Jessimine Cottage, Smethurst Road, Orrel, near Wigan. Application date, January 28, 1919.

The tar is passed through a heater containing a pipe coil through which vapour from one of the stills passes to heat the tar. The tar then passes to a pitch cooler also containing tubes which are surrounded and heated by the outgoing pitch. The hot tar then passes to a still where the light oil is distilled off and passes to a water-cooled coil where the light oil is condensed; the permanent gas is drawn off through a separator and used to heat the stills. The residual tar from the first still passes to another still where the creosote oil and anthracene oil are driven off and are then passed through the pipe coil in the tar heater to heat the tar and condense the oil. The creosote and anthracene are separated by drawing off the condensate at different points of the pipe coil.

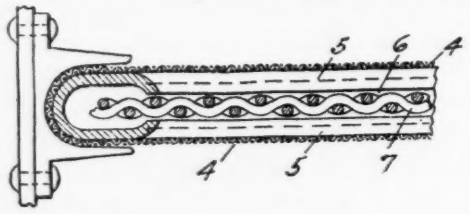
139,296. Mono-Polar Electrode Electrolysers. G. G. Hepburn, 52, Newport Road, Chorlton-cum-Hardy, Manchester. Application date, February 22, 1919.

The electrolyser is of the press type and is particularly adapted for the manufacture of chlorine and an alkali by the electrolysis of brine. Each cell is provided with an anode and a cathode and an intermediate diaphragm. The anode and diaphragm, and the cathode and diaphragm are separated by similar rectangular frames each having an inverted channel at the upper end for collecting gas. The electrolyser consists of a number of such cells which are electrically independent of one another and have independent liquid connections and are insulated from the adjacent cells. The construction of the cells is described in detail, and they may be connected in series without the usual current leakage through the liquid circulating between adjacent cells.

139,390. Filter Leaves. A. R. Peck, 801, Merchants' National Bank Building, Los Angeles, Cal., U.S.A. Application date, October 22, 1918.

The object is to construct filter leaves adapted to be carried by a stationary plate which covers the opening of a movable chamber in the filtering apparatus, described in Specification 138,657, dated October 22, 1918. (*See* The Chemical Age,

Vol. II., page 310). Each leaf is formed of a filter cloth 4 which completely encloses a rectangular frame 5 formed of a tube bent into a rectangle. The tube is flattened in the plane of the frame and is slotted around its inner periphery at 6 to



139,390

receive the outer rim of a flat wire screen 7 of similar shape. The frames are mounted on a stationary plate and are separated by adjustable lugs while an outlet pipe is connected to each of a pair of adjacent corners of the tubular rim.

139,419. GALLIC ACID, PREPARATION OF. E. C. R. Marks, London. (From Nitritfabrik Aktiengesellschaft Coepenick, near Berlin.) Application date, August 29, 1919.

A solution or suspension of tannin is heated with hydroxides, oxides or salts of alkali, alkaline earth and other metals such as magnesium, aluminium, lead, copper, zinc, &c., but preferably the carbonates and hydroxides of the alkaline earths. The quantity of such additions should be at least such that all the hydrogen atoms of the carboxyl and hydroxyl groups originally present and formed by the hydrolysis are substituted by the metal. The resulting metallic gallates are then decomposed with acid to produce gallic acid.

139,441. CARBAZOLE, PURIFICATION OF. South Metropolitan, Gas Co., 709, Old Kent Road, London, S.E.15, and W. Kirby, 17, Micheldever Road, Lee, London, S.E.12. Application date, November 14, 1919.

Carbazole is dissolved in strong sulphuric acid and then slowly diluted with water, so that the carbazole separates in comparatively large crystals which may be readily filtered. The dilution of the sulphuric acid may be effected slowly by blowing moist air through it.

139,443. ZINC SULPHATE, PURIFICATION OF SOLUTIONS OF. Compagnie des Produits Chimiques d'Alais et de la Camargue, 126, Rue de la Boetie, Paris. International Convention date (France), September 12, 1919.

A solution of zinc sulphate containing copper or cadmium sulphates as impurities may be purified of copper by inserting into it a plate of copper and a plate of zinc in contact; the copper is deposited on the copper plate and an equivalent quantity of zinc is dissolved. The cadmium may be similarly removed by substituting a cadmium plate for the copper plate. If copper and cadmium are present together, they may be simultaneously removed by using plates of zinc and carbon.

International Specifications Not yet Accepted

138,061. PHENOL-ALDEHYDE CONDENSATION PRODUCTS. L. Jaloustre, Z. Kheifetz and M. Warchavsky, 18, Place de Laborde, Paris. International Convention date, January 23, 1919.

Insoluble and infusible products are obtained by condensing phenol with formaldehyde in the presence of slaked lime, sodium cyanide, baryta or strontia. The product may be used for making varnishes, &c.

138,078. CELLULOSE ESTERS. G. Bonwitt, 80, Knesebeckstrasse, Charlottenburg, Berlin. International Convention date, June 6, 1917.

Cellulose nitrate, acetate, or nitro-acetate is dissolved in furfurol or a homologue or derivative, with or without other solvents, diluents, or softening agents, in order to produce solutions, varnishes or plastic material. Various examples are given.

138,099. GLYCERINE. Vereinigte Chemische Werke Akt.-Ges., 16, Salzufer, Charlottenburg, Berlin. International Convention date, April 12, 1915.

Sugars are fermented in alkaline solutions such as ammonium or sodium carbonate or phosphate, amines, &c., by means of yeast and a catalyst such as manganese or iron sulphate. A yield of about 12 per cent. of glycerine is produced, and is extracted and purified.

138 111. ALKALI CHROMATES. Soc. Industrielle de Produits Chimiques, 10, Rue de Vienne, Paris. International Convention date, August 2, 1917.

Fused alkali chromate products are dissolved and treated with carbonic acid to precipitate silica and alumina and recover the surplus alkali. The purified chromate is filtered off.

138,113. ALDEHYDE-ACIDS. C. P. Byrnes, Sewickley, Pa., U.S.A. (Assignee of J. H. James, Pittsburgh, U.S.A.) International Convention date, January 22, 1919.

Vapour of crude petroleum, shale oil, &c., is mixed with air and steam and passed over a catalyst consisting of complex rare metal oxides containing acid oxides of titanium, vanadium, chromium, manganese, zirconium, mobium, molybdenum, tantalum, tungsten, or manium, and basic oxides of these metals or of iron, copper, nickel, cobalt, lanthanum, or rare earth metals; examples of such catalysts are "blue" molybdenum oxides, chromic chromate, tungsten tungstate, uranyl molybdate and molybdite, cobalt molybdate and molybdite, uranyl vanadate and vanadite. At a temperature of 230° to 450°C., aldehyde fatty acids are formed. The process and apparatus are described in detail.

LATEST NOTIFICATIONS.

140,359. Halogenated Quinonic Products, Process for the Production of. Papeteries Berges Soc. Anon. March 18, 1919.

140,371. Catalysts for use in the Hydrogenation of Unsaturated Organic Compounds. Nordiske Fabriker De-No-Fa Aktieselskap. March 17, 1919.

140,372. Fish Oils, Treatment of. Nordiske Fabriker De-No-Fa Aktieselskap. March 18, 1919.

140,387-8. Rubber, Process for the Vulcanisation of. G. Bruni. March 15 and March 19, 1919.

140,394. Nitrogen Compounds. Nitrogen Corporation. September 1, 1917.

140,439. Ammonia, Production of. Nitrogen Corporation. March 17, 1919.

140,444 and 140,454. Furnaces, Open-hearth. T. S. Blair. September 12, 1916, and July 20, 1917.

Specifications Accepted, with Date of Application

125,980. Retort Ovens for the Distillation of Fuels and Bituminous ores. E. Hauser. April 20, 1918.

130,963. Potassium Compounds, Process for Extracting—from Rocks containing Potassium, and simultaneously Producing Nitrogen—containing Fertilisers. C. Rossi. August 9, 1918.

132,245. Aliphatic Amines, Process for Substituting Halogens for the Amino Groups in. Chemische Fabrik Flora. August 31, 1918.

137,811. Electrodes for Electric Furnaces. Norske Aktieselskab for Elektrokemisk Industri Norsk Industri-Hypotekbank. January 17, 1919.

139,535. Ore Concentration. E. C. R. Marks. (*Luckenbach Processes.*) November 4, 1918.

139,578. Gas Producers. L. Fornas. February 13, 1919. (Addition to 123,323).

139,597. Mixing and Sifting Powdered and Granulated Substances. B. Young. February 26, 1919.

139,661. Separating Minerals from Ore-bearing Minerals, Machine for. R. P. Park. April 14, 1919.

139,663. Gas-mixing Purposes, Devices for. C. A. Couch. April 16, 1919.

139,731. Gas Producers or Carbonising Plants, Furnace Grates, more particularly for use with. J. Wells. September 19, 1919.

139,732. Conducting a Liquid and a Gas which is Soluble in the said Liquid through a Closed Cycle of Thermal Operations. C. H. Beadle. September 24, 1919.

Book Received

A FOUNDATION COURSE IN CHEMISTRY. For students of agriculture and technology. By J. W. Dodgson, B.Sc. (Lond,), A.I.C., and J. Alan Murray, B.Sc. (Edin). Second edition. Hodder & Stoughton, London. Pp. 240. 6s. 6d. net.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co. and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The weekly report contains only commodities whose values are at the time of particular interest or of a fluctuating nature. A more complete report and list are published once a month. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

British Market Report

WEDNESDAY, March 31.

Trade generally continues very active, and where price changes have occurred these have been in an upward direction.

Business is still restricted to a large extent on account of the shortage of supplies, but there is an indication that production in some factories is slightly improving, but any such extra supplies are readily absorbed.

On the other hand, however, some products are becoming scarcer than ever.

Export business remains brisk, and considerable orders are being placed for delivery during the latter half of the year.

General Chemicals

ACETONE is firmer and a good trade is being transacted.

ACID ACETIC has again advanced in price, and still higher figures are being quoted for forward delivery from America.

ACID CARBOLIC is extremely scarce for near delivery, and higher prices are being paid.

ACID CITRIC is becoming scarcer every day, and it would seem as if the market must still further advance.

ACID FORMIC.—There is no change to report in this article.

ACID OXALIC is without change, but it is exceedingly difficult to obtain for near delivery.

ACID TARTARIC has again advanced, and is very difficult to obtain for spot delivery.

ARSENIC is again slightly easier and there are better supplies available.

BARIUM SALTS are about as they were and trade is quite brisk.

BLEACHING POWDER is unobtainable on the spot for near delivery, but prices are nominally without change, although fancy prices are being paid for any re-sale parcels which appear.

FORMALDEHYDE is without change.

GLAUBER SALTS are in extreme demand and price is nominal.

IRON PERCHLORIDE has advanced owing to the firmer tendency of hydrochloric acid.

IRON SULPHATE (GREEN COPPERAS) is in better demand, but price is without alteration at present.

LEAD ACETATE is quieter, but there is a very firm undertone to this market.

POTASSIUM BICHROMATE.—Heavy premiums continue to be paid on makers' prices, and the material is almost impossible for spot delivery.

POTASSIUM CARBONATE is without change, but there are only moderate supplies available.

POTASSIUM CHLORATE is in slightly better demand, and the price shows a firmer tendency than has been the case of late.

POTASSIUM PERMANGANATE is in good request, with a firmer tendency.

POTASSIUM PRUSSIATE is wanted, and stocks of foreign material now appear to be somewhat lighter than was the case recently.

SODIUM ACETATE is on the quiet side, but price is maintained.

SODIUM BICHROMATE.—There is no change in the nominal position of this material.

SODIUM CHLORATE remains dull.

SODIUM CAUSTIC.—The price is without change, with a firm undertone, and some good business has been transacted.

SODIUM HYPOSULPHITE is again higher, with very little spot material available.

SODIUM NITRITE remains almost unobtainable on the spot, and heavy prices have been paid for near delivery.

SODIUM PHOSPHATE remains scarce and the price looks like advancing.

SODIUM PRUSSIATE is without change.

SODIUM SULPHIDE continues scarce, and, with the prevailing scarcity of the raw material, there does not appear to be any early opportunity of a decline in value.

ZINC SALTS are without change.

Coal Tar Intermediates

There is nothing of note to report in this market, although perhaps it is reasonable to suppose that there may be some slight relief before long to home trade consumers, as the granting of export licences are refused.

ALPHA NAPHTHYLAMINE continues scarce and price is without change.

BETA NAPHTHOL.—The small quantity of material arriving from the States is not sufficient to ease the position to any extent.

BENZIDINE BASE is in good request, but near delivery cannot be given.

DIPHENYLAMINE is in moderate request, but delivery is difficult to obtain.

NAPHTHIONATE OF SODA is scarce.

PARANITRANILINE is without change in value, and makers have notified an advance owing to the increase in the cost of raw material.

PARA NITRO TOLUOL is wanted, but early delivery cannot be obtained.

SALICYLIC ACID is badly wanted, but early delivery is not possible while makers hesitate to quote very far forward on account of the uncertain position prevailing in regard to the raw material.

Coal Tar Products

There is little change in our market since last week.

90's BENZOL remains at 2s. 5d. on rails.

CRESYLIC ACID supplies are scarce, and for Pale quality (97 to 99 per cent.) the price is 4s. 3d. per gallon; for Dark (95 to 97 per cent.) 4s. per gallon.

CREOSOTE OIL remains firm at about 11d. to 11½d. in the North, and 11½d. to 1s. in the South.

SOLVENT NAPHTHA is worth 3s. 2d. to 3s. 3d. per gallon.

HEAVY NAPHTHA is worth 3s. 6d. per gallon and is difficult to obtain.

NAPHTHALENE has a very strong market, and supplies are very difficult to obtain. Crude is worth £14 to £18 per ton, and Refined £33 to £36 per ton.

PITCH.—The position is unchanged.

Sulphate of Ammonia

The Home demand remains strong, and the production is hardly sufficient to meet all requirements.

Current Prices

Chemicals

	per	£	s.	d.		£	s.	d.
Acetic anhydride	lb.	0	3	3	to	0	3	6
Acetone oil	ton	80	0	0	to	83	0	0
Acetone, pure	ton	92	0	0	to	95	0	0
Acid, Acetic, glacial, 99-100%	ton	105	0	0	to	110	0	0
Acetic, 80% pure	ton	90	0	0	to	92	10	0
Arsenic	ton	100	0	0	to	105	0	0
Boric, cryst.	ton	74	10	0	to	76	0	0
Carbolic, cryst. 39-40%	lb.	0	1	5	to	0	1	5½
Acid, Citric	lb.	0	6	6	to		—	
Formic, 80%	ton	115	0	0	to	120	0	0
Gallic, pure	lb.	0	7	3	to	0	7	9
Hydrofluoric	lb.	0	0	7	to	0	0	8
Lactic, 50 vol.	ton	65	0	0	to	70	0	0
Lactic, 60 vol.	ton	80	0	0	to	85	0	0
Nitric, 80 Tw.	ton	40	0	0	to	42	0	0
Oxalic	lb.	0	2	8	to	0	2	9
Phosphoric, 1.5	ton	60	0	0	to	65	0	0
Pyrogallic, cryst	lb.	0	11	6	to	0	11	9
Salicylic, Technical	lb.	0	3	0	to	0	3	3
Salicylic, B.P.	lb.	0	3	9	to	0	4	0
Sulphuric, 92-93%	ton	7	10	0	to	8	0	0
Tannic, commercial	lb.	0	5	0	to	0	5	3
Tartaric	lb.	0	4	0	to	0	4	1
Alum, lump	ton	19	10	0	to	20	0	0
Alum, chrome	ton	93	0	0	to	95	0	0
Alumino ferric	ton	9	10	0	to	10	0	0
Aluminium, sulphate, 14-15%	ton	17	0	0	to	18	0	0
Aluminium, sulphate, 17-18%	ton	19	10	0	to	20	0	0
Ammonia, anhydrous	lb.	0	1	9	to	0	2	0
Ammonia, .880	ton	35	0	0	to	37	10	0
Ammonia, .920	ton	20	0	0	to	24	0	0
Ammonia, carbonate	lb.	0	0	7½	to		—	
Ammonia, chloride	ton	95	0	0	to	97	10	0
Ammonia, muriate (galvanisers)	ton	52	0	0	to	54	0	0
Ammonia, nitrate	ton	60	0	0	to	65	0	0
Ammonia, phosphate	ton	135	0	0	to	140	0	0
Ammonia, sulphocyanide	lb.	0	2	3	to	0	2	6
Amyl, acetate	ton	360	0	0	to	370	0	0
Arsenic, white, powdered	ton	67	10	0	to	70	0	0
Barium, carbonate	ton	13	10	0	to	14	10	0
Barium, carbonate, 92-94%	ton	14	10	0	to	15	0	0
Chlorate	lb.	0	1	4	to	0	1	5
Chloride	ton	27	0	0	to	28	0	0

	per	£	s.	d.		£	s.	d.
Barium, Nitrate	ton	50	0	0	to	51	0	0
Sulphate, blanc fixe, dry	ton	25	10	0	to	26	0	0
Sulphate, blanc fixe, pulp	ton	15	10	0	to	16	0	0
Bleaching powder, 35-37%	ton	18	10	0	to	19	0	0
Borax crystals	ton	41	0	0	to	42	0	0
Calcium acetate, Brown	ton	18	10	0	to	20	0	0
,, Grey	ton	38	0	0	to	40	0	0
Carbide	ton	28	0	0	to	30	0	0
Chloride	ton	10	10	0	to	11	10	0
Carbon bisulphide	ton	58	0	0	to	59	0	0
Casein, technical	ton	80	0	0	to	83	0	0
Cerium oxalate	lb.	0	3	9	to	0	4	0
Chromium acetate	lb.	0	1	0	to	0	1	2
Cobalt acetate	lb.	0	7	0	to	0	7	6
Oxide, black	lb.	0	7	9	to	0	8	0
Copper chloride	lb.	0	1	3	to	0	1	6
Sulphate	ton	48	0	0	to	50	0	0
Cream Tartar, 98-100%	ton	305	0	0	to	310	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde 40% vol	ton	350	0	0	to	360	0	0
Formusol (Rongalite)	lb.	0	4	0	to	0	4	3
Glauber salts	ton	5	0	0	to	5	10	0
Glycerine, crude	ton	72	0	0	to	74	10	0
Hydrogen peroxide, 12 vols.	gal.	0	2	9	to	0	3	0
Iron perchloride	ton	50	0	0	to	52	0	0
Iron sulphate (Copperas)	ton	4	10	0	to	4	15	0
Lead acetate, white	ton	105	0	0	to	110	0	0
Carbonate (White Lead)	ton	75	0	0	to	78	0	0
Nitrate	ton	80	0	0	to	85	0	0
Litharge	ton	70	0	0	to	71	0	0
Lithophone, 30%	ton	60	0	0	to	62	0	0
Magnesium chloride	ton	15	10	0	to	16	10	0
Carbonate, light	cwt.	2	15	0	to	3	0	0
Sulphate (Epsom salts commercial)	ton	14	0	0	to	14	10	0
Sulphate (Druggists')	ton	18	10	0	to	19	10	0
Manganese, Borate	ton	180	0	0	to	185	0	0
Sulphate	ton	80	0	0	to	82	10	0
Methyl acetone	ton	89	0	0	to	90	0	0
Alcohol, 1% acetone	gall.	Nominal						
Nickel ammonium sulphate, single salt	ton	47	10	0	to	52	10	0
Potassium bichromate	lb.	0	1	10	to	0	2	0
Carbonate, 90%	ton	102	0	0	to	105	0	0
Chloride	ton	Nominal.						
Potassium Chlorate	lb.	0	1	1	to	0	1	2
Hydrate, 88-90%	ton	115	0	0	to	120	0	0
Meta-bisulphite, 50-52%	ton	260	0	0	to	270	0	0
Nitrate, refined	ton	70	0	0	to	72	0	0
Permanganate	lb.	0	6	6	to	0	7	0
Prussiate, red	lb.	0	6	0	to	0	6	3
Prussiate, yellow	lb.	0	2	3½	to	0	2	4½
Sulphate, 90%	ton	31	0	0	to	33	0	0
Salammoniac, firsts	cwt.	4	15	0	to		—	
Seconds	cwt.	4	10	0	to		—	
Sodium acetate	ton	60	0	0	to	62	0	0
Arsenate, 45%	ton	60	0	0	to	62	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Sodium, Bichromate	lb.	0	2	1	to	0	2	2
Bisulphite, 60-62%	ton	44	10	0	to	45	10	0
Chlorate	lb.	0	0	5½	to	0	0	6½
Caustic, 70%	ton	42	10	0	to	43	10	0
Caustic, 76%	ton	44	10	0	to	45	10	0
Hydrosulphite, powder, 85%	lb.	0	3	3	to	0	3	6
Hyposulphite, commercial	ton	27	10	0	to	29	10	0
Nitrite, 96-98%	ton	120	0	0	to	125	0	0
Phosphate, crystal	ton	39	0	0	to	40	0	0
Perborate	lb.	0	2	2	to	0	2	4
Prussiate	lb.	0	2	0	to	0	2	1
Sulphide, crystals	ton	22	0	0	to	23	0	0
Sulphide, solid, 60-62%	ton	43	0	0	to	44	10	0
Sulphite, cryst.	ton	13	10	0	to	14	10	0
Strontium, carbonate	ton	85	0	0	to	90	0	0
Nitrate	ton	85	0	0	to	90	0	0
Sulphate, white	ton	8	10	0	to	10	0	0
Sulphur chloride	ton	42	0	0	to	44	10	0
Sulphur, Flowers	ton	25	0	0	to	27	0	0
Roll	ton	24	0	0	to	26	0	0
Tartar emetic	lb.	0	3	5	to	0	3	6
Tin perchloride, 33%	lb.	0	2	6	to	0	2	7
Perchloride, solid	lb.	0	3	0	to	0	3	3
Protochloride (tin crystals)	lb.	0	2	9	to	0	3	0
Zinc chloride, 102 Tw.	ton	24	0	0	to	26	10	0
Chloride, solid, 96-98%	ton	60	0	0	to	65	0	0
Oxide, 99%	ton	82	10	0	to	85	0	0
Oxide, 94-95%	ton	67	10	0	to	70	0	0
Dust, 90%	ton	90	0	0	to	92	10	0
Sulphate	ton	23	0	0	to	24	0	0

Coal Tar Intermediates, &c.

	per	£	s.	d.		£	s.	d.
Alphanaphthol, crude	lb.	0	3	9	to	0	4	0
Alphanaphthol, refined	lb.	0	4	3	to	0	4	6
Alphanaphthylamine	lb.	0	3	6	to	0	3	9
Aniline oil, drums extra	lb.	0	1	5	to	0	1	6
Aniline salts	lb.	0	1	10	to	0	2	0
Anthracene, 85-90%	lb.		—		to		—	
Benzaldehyde (free of chlorine)	lb.	0	5	6	to	0	6	0
Benzidine, base	lb.	0	12	6	to	0	13	6
Benzidine, sulphate	lb.	0	10	0	to	0	11	0
Benzoic, acid	lb.	0	5	9	to	0	6	0
Benzoate of soda	lb.	0	5	9	to	0	6	0
Benzyl chloride, technical	lb.	0	2	3	to	0	2	6
Betanaphthol benzoate	lb.	1	6	0	to	1	7	6
Betanaphthol	lb.	0	4	9	to	0	5	0
Betanaphthylamine, technical	lb.	0	8	6	to	0	9	0
Croceine Acid, 100% basis	lb.	0	5	6	to	0	6	6
Dichlorbenzol	lb.	0	0	6	to	0	0	7
Diethylaniline	lb.	0	7	9	to	0	8	6
Dinitrobenzol	lb.	0	1	5	to	0	1	6
Dinitrochlorbenzol	lb.	0	1	5	to	0	1	6
Dinitronaphthaline	lb.	0	1	4	to	0	1	6
Dinitrotoluol	lb.	0	1	8	to	0	1	9
Dinitrophenol	lb.	0	3	3	to	0	3	6
Dimethylaniline	lb.	0	4	9	to	0	5	0
Diphenylamine	lb.	0	4	6	to	0	4	9
H-Acid	lb.	0	13	6	to	0	14	0
Metaphenylenediamine	lb.	0	5	9	to	0	6	0
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	7	6	to	0	8	6
Monosulphonic Acid (2:7)	lb.	0	7	6	to	0	8	0
Naphthionic acid, crude	lb.	0	5	6	to	0	5	9
Naphthionate of Soda	lb.	0	6	0	to	0	6	6
Naphthylamin-di-sulphonic-acid	lb.	0	5	6	to	0	6	6
Nitronaphthaline	lb.	0	1	3	to	0	1	4
Nitrotoluol	lb.	0	1	3	to	0	1	6
Orthoamidophenol, base	lb.	0	18	0	to	1	0	0
Orthodichlorbenzol	lb.	0	1	0	to	0	1	2
Orthotoluidine	lb.	0	2	9	to	0	3	0
Orthonitrotoluol	lb.	0	1	6	to	0	1	8
Para-amidophenol, base	lb.	0	15	0	to	0	16	0
Para-amidophenol, hydrochlor	lb	0	15	6	to	0	16	0
Paradichlorbenzol	lb.	0	0	6	to	0	0	8
Paranitraniline	lb.	0	7	9	to	0	8	0
Paranitrophenol	lb.	0	2	6	to	0	2	9
Paranitrotoluol	lb.	0	5	3	to	0	5	6
Paraphenylenediamine, distilled	lb.	0	13	6	to	0	14	6
Paratoluidine	lb.	0	7	6	to	0	8	6
Phthalic anhydride	lb.	0	9	0	to	0	10	0
R. Salt, 100% basis	lb.	0	4	0	to	0	4	2
Resorcin, technical	lb.	0	11	6	to	0	12	6
Resorcin, pure	lb.	0	17	6	to	1	0	0
Salol	lb.	0	5	9	to	0	6	0
Shaeffer acid, 100% basis	lb.	0	3	6	to	0	3	0
Sulphanilic acid, crude	lb.	0	1	9	to	0	1	10
Tolidine, base	lb.	0	10	6	to	0	11	6
Tolidine, mixture	lb.	0	3	0	to	0	3	6

Manchester Chemical Trade

SIR S. W. ROYSE & CO., LTD., in their monthly circular state:—Business has perhaps not been quite so brisk during March as in recent months, but this may be accounted for to a large extent by increased shortness of supplies. Most manufacturers have as many orders in hand at present as they care to book, and any odd lots of most goods in second hands realise full figures. The transport position has improved somewhat, and there is less difficulty in regard to shipments. Sulphate of copper has been disappointing, the Continental enquiry being very poor, and the February returns show exports of only 1,822 tons against 3,383 tons for February of last year. The strong export demand for green copperas continues, but suitable packages are still difficult to obtain. Acetates of lime have been called for more freely. Good business has been done in acetate of soda; price is again higher with the further advance in acetic acid. Acetates of lead are firmly held in spite of the fluctuations in the metal. Nitrate of lead is also in good request. Carbonate of potash is somewhat scarce and prices are firm. There has been more enquiry for Montreal potashes, and full figures are asked. Supplies of white powdered arsenic have been more plentiful and sufficient to meet the demand. There is a scarcity in yellow prussiates, prices are higher and the present disparity in the values of potash and soda is interesting consumers more in the former. Tartaric acid is in strong request and supplies are unequal to the demand. The high price of citric acid has restricted business. Stocks of cream of tartar are very small and higher figures are quoted. Bichromates are still in short supply and heavily called for especially for export. The demand for oxalic acid remains considerably in excess of the supply, and higher prices are being paid for any available parcels. Borax and boracic acid are unchanged.

Company News

ELECTRO BLEACH & BY-PRODUCTS.—Further interim dividends have been declared for the year 1919 of 3½ per cent., less tax, on the preference shares (making a total for the year of 7 per cent.), and of 7¾ per cent., less tax, on the ordinary shares (making a total for the year of 14 per cent.); both dividends to be paid on April 23, to the shareholders registered with the company on March 27.

UNITED GLASS BOTTLE MANUFACTURERS.—A dividend of 10 per cent. (2s. per share), less tax, has been declared on the ordinary shares for the half-year, making 15 per cent. for the year; £7,840 written off cost of additional capital; £15,000 to general reserve; £15,000 in reduction of capital assets; £1,190 loss on realisation of War Loan; £45,897 forward, subject to directors' and management percentage. Last year the dividend was 4½ per cent., making 8 per cent. for the year.

HADFIELDS LIMITED.—At the annual meeting held at Sheffield on Monday it was decided to increase the capital by £500,000 to enable the directors to carry into effect an agreement for an exchange of shares with Harper Bean, Ltd. The agreement provides for an exchange of 166,666 of Hadfield ordinary shares for £250,000 worth of Harper Bean's shares, of which two-thirds are in 8 per cent. cumulative preference and one-third in ordinary shares. An opportunity has since arisen to acquire a block of 30,000 shares in John Baker & Co., of Rotherham.

MUNTZ'S METAL CO.—It is proposed to increase the capital by the distribution of one ordinary share for every two ordinary shares now held, in order to bring the issued capital more in accord with that used in the business. An allotment on these terms means an addition of approximately £53,733 to the ordinary share capital, and to meet this the company has a reserve fund of £75,000. During the past year the net profits were £38,280. The dividend is maintained at 10 per cent., and a bonus of 1s. per share is also recommended.

SIR W. G. ARMSTRONG, WHITWORTH & CO.—The directors have declared a dividend on the ordinary shares for the half-year ended December 31 last of 1s. 6d. per share, which with the interim dividend of 1s. per share already paid, makes 2s. 6d. per share for the year, free of income tax up to an amount of 5s. in the £. The usual dividends on the first, second, and third preference shares will also be paid in accordance with the terms of the offer of sale of the new ordinary and new preference shares. The dividend will be calculated from the date of allotment, December 6 to December 31, 1919.

Detention of Sulphide of Sodium

THE action brought by Mr. Luigi Ferdinando di Riva, a merchant carrying on business at Milan, Italy, against Messrs. Simon Smits & Co., Ltd., shipping agents, of Great Tower Street, London, in respect of the alleged non-delivery, detention and conversion of 25 tons of sulphide of sodium entrusted to them for carriage to Italy in February 1919, again came before Mr. Justice Roche in the Commercial Court of the King's Bench Division on Tuesday, March 30.

After hearing counsel for both sides, his lordship said he had already decided the question of liability, and the only matter remaining was the amount of compensation the defendants should pay the plaintiff. He thought the payment should be made at the rate of exchange contended for by the plaintiff and gave judgment for him for £1,560 with costs.

The British Chemical Trade Association

THE Association has been requested by an American, who is at present in London, to be put in touch with United Kingdom firms who are in a position to offer fine chemicals, drugs, medicinal roots, herbs and roots. Members interested should communicate to the Secretary, B.C.T.A.

The Association has been advised by the Department of Overseas Trade that a British firm of wholesale and retail druggists of first-class standing, in Valparaiso, desire to get into touch with United Kingdom firms in a position to offer fine chemicals such as bismuth salts, quinine salts, synthetic drugs, alkaloids, &c., medicinal roots, herbs, flowers, &c. The head of the above firm proposes to visit the United Kingdom, leaving Chile about the middle of April. Members interested are invited to communicate to the Secretary, B.C.T.A.

Royalties to Inventors

THE Chloride Electrical Company, of Manchester, appeared before the Royal Commission on awards to inventors on Monday to claim a royalty of 6d. for each of their improvements to electrical accumulators supplied to the Ministry of Munitions through four accumulator firms, on the ground that the Ministry had advised the claimants that they would be responsible for royalty payments. The claim covered the sale of 53,000 improvements, as against the Ministry's figure of 18,000. After hearing the claimant's statement, Mr. Justice Sargant suggested that the Chloride Company and the Ministry representatives should go into the matter of the figures, and, if they could come to an agreement, he thought the royalty of expenses on each accumulator supplied was not unreasonable.

Catalogues Received

W. Heffer & Sons, Ltd.

A useful list of scientific works and publications of Learned Societies. These are arranged in sections dealing with the various branches of science, which are again divided into sub-sections where necessary. The alphabetical order of the books under each heading facilitates reference.—Cambridge.

Frank Gilman

A concise illustrated pamphlet describing in detail the "Skato-skalo" patent pneumatic boiler and other cleaning tools, of which Mr. Gilman is the sole maker. The tools are designed for removing scale from various kinds of boilers, and are made in various sizes, according to the particular boilers to be cleaned. No skilled labour is required to operate them, and they are claimed to be absolutely fool-proof. Full particulars are given of approximate weight, dimensions, price, &c., as well as instructions as to their use. The catalogue is accompanied by an extensive list of users of the tools. This list includes, besides a large number of industrial concerns in this and other countries, a number of Government departments and municipal bodies.—9, Westfield Road, Birmingham.

Cochran & Co., Annan, Ltd.

A bound catalogue, divided into 14 sections, describing Cochran boilers. The sections include illustrated descriptions of the various types of boilers supplied, with summaries of results of trials, lists of installations, shipping specifications (to enable exporters to calculate approximate freight on standard boilers), an example of the rapidity with which the boilers can be erected and set to work, and photographs showing their internal accessibility. In addition to a price list, which is subject to alterations, there are pamphlets dealing with special types of boilers. One of these illustrates a type which will give 2,000 lb. of steam per hour without the use of coal. This is accomplished by placing the boiler on the outlet of a heating furnace consuming 3½ cwt. of coal per hour, with a waste gas temperature of 2,000°F. Finally, a publication entitled "Notes on Up-to-date Boiler Practice" is included. This is specially adapted for the use of students in universities and technical colleges, and contains an outline of the practice followed in manufacturing Cochran boilers. It is specially instructive in that it gives the generally accepted reasons why the practice is followed.—Annan, Scotland.

Chas. Hearson & Co., Ltd.

A well illustrated volume of 266 pages describing the various apparatus supplied. Chief among these are the biological incubators for the cultivation of micro-organisms, researches in embryology, histology, testing cements, regulating chronometers, &c. In this connection it is interesting to note that one of the leading dealers in laboratory apparatus in the U.S.A. state that from careful experiments made on various electrically-heated incubators, those made by Messrs. Hearson have given results in the way of uniform distribution of temperature over the incubating compartment far superior to any others they have tried. The incubators are constructed to work with coal gas, air gas (or gasoline gas), water gas (or Mond gas), acetylene, petroleum, electricity and ice. The method of heating or cooling is determined by the temperatures required and the conditions under which the apparatus is to be used. Other products in the catalogue include laboratory benches, racks, fume cupboards, laboratory wagons, paraffin baths and ovens, and an extended list of laboratory accessories and apparatus. An alphabetical index is provided, as well as a price list. The prices are necessarily subject to alteration.—235, Regent Street, London, W.1.

Gas Developments, Ltd.

This company issue two booklets—"The Maxted Process for the Economic Manufacture of Pure Hydrogen" and "Oil Hydrogenation Plant (Maxted's System)" respectively. The first describes a method evolved by Gas Developments, Ltd., whereby hydrogen of the high quality of electrolytic hydrogen, and completely free from catalyst poisons, can be produced directly, and without subsequent purification, from water gas. Curves are given comparing the fat-hardening properties of hydrogen containing various small percentages of carbon-monoxide and also the fat-hardening properties of hydrogen produced by the Maxted process, electrolytic hydrogen and water-gas hydrogen. Tests were carried out over the period of an hour with pure olive oil containing 1 per cent. nickel, at a temperature of 180°C., and the second diagram shows the hydrogen from the Maxted process to be of slightly higher efficiency than the electrolytic hydrogen for 55 minutes, the curves running concurrently for the last five minutes. The cost of production by the Maxted process is equal to that of producing ordinary water-gas hydrogen. The process can also be installed at the same price, and existing plants producing hydrogen by the intermittent process can be converted for producing it by the Maxted process at a very small cost. The second book describes the plant used for the production of pure hydrogen, and includes an illustration. The outstanding features of the system are the high speed of re-action, simplicity of construction of the plant, the moderate working pressure and low working temperature.—Ettingsall, Wolverhampton.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

London Gazette

Companies Winding Up Voluntarily

COLORADO NITRATE CO., LTD. (In voluntary liquidation).—A general meeting of members will be held at 12, King Street, Liverpool, on Tuesday, April 27, at 12 noon. H. H. Robson, Liquidator.

INDO-BURMA OILFIELDS, LTD.—A meeting of creditors will be held at 69, Broad Street Avenue, London, E.C., on Monday, April 12, at 2.30 p.m. A. A. Hall, Liquidator.

NATIONAL EXPLOSIVES CO., LTD.—A meeting of creditors will be held at the offices of the Liquidator, 116, Victoria Street, Westminster, London, S.W. 1, on Thursday, April 1, at 11.30 a.m. O. Williams, Liquidator.

TYNESIDE ALLOYS CO., LTD.—A meeting of creditors will be held at the Company's registered offices, Pelaw, Newcastle-on-Tyne, on Monday, April 12, at 11 a.m. The notice of meeting is purely formal, as all debts of the Company have been or will be paid in full. A. Y. Jones, Liquidator.

Notice of Dividend

HEESCH, ERNEST ERWIN FERDINAND (now carrying on business under the style of The Gatap Co.), lately residing at 158, Woodsley Road, and formerly carrying on business as a manufacturer's agent at 212, Wellington Street, now residing at 59, Clarendon Road, and carrying on business as an oxy-acetylene welder and chemical manufacturer at Stansfield Mill, 77 and 79, Kirkstall Road, all in the city of Leeds. 1s. 6d. First and Final. April 7. Official Receiver's Offices, 24, Bond Street, Leeds.

Liquidators' Notices

COVENTRY CONCRETE CO., LTD.—A general meeting of members will be held at 9, Chapel Street, Preston, on Tuesday, April 27, at 7.30 p.m. H. Harrison, Liquidator.

TURNER BROTHERS ASBESTOS CO., LTD.—A meeting of creditors will be held at the registered office, Woodland Road, Spotland, Rochdale, on Thursday, April 8, at 10 a.m. H. S. Howorth, Liquidator.

County Court Judgment

NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

FURNIVAL, CHARLIE, 45, High Street, Winchester, chemists' manager. £17. 18s. February 18.

New Companies Registered

The following list has been prepared for us by Jordan & Sons, Ltd., company registration agents, 116 and 117, Chancery Lane, London, W.C. :—

HANCOCK, WRIGHT & CO., LTD., 106, High Street, Battersea.—Manufacturers of chemicals, drugs and minerals, &c. Nominal Capital, £5,000 in 5,000 shares of £1 each. Directors: H. J. Hancock, 1, Spencer Park, S.W.18; S. J. Stafford, 18, Penford Street, Camberwell, S.E.5. Qualification of Directors, one share.

LINCOLN & MIDLAND COUNTIES DRUG CO., LTD., Tanner's Lane, High Street, Lincoln.—Manufacturers of medicines, drugs, surgical instruments, &c. Nominal Capital, £150,000 in 35,000 7½ per cent. preference shares of £1 each, and 11,000 ordinary shares of £1 each. Directors: F. Brown, Park Street Works, Lincoln; F. A. Clarke, 48, Wilbury Road, Hove; P. C. Clarke, Longthorpe, Peterborough. Qualification of Directors, £1,000.

LINTHORPE-DINSDALE SMELTING CO., LTD., Post Office Buildings, Middlesbrough.—Ironmasters, iron and steel manufacturers, chemical manufacturers, &c. Nominal Capital, £520,000 in 520,000 shares of £1 each. Minimum subscription, 10 per cent. Directors: I. Williams, Normanby Hall, Eston, Yorkshire; J. Torbock, Crossrigg Hall, near Pensith; P. Williams, Pinclinsthorpe Hall, Guisbrough; E. T. John, Llanidan Hall, Llanfair, Anglesey. Qualification of Directors, £1,000.

NOTTS & DERBY COKE & BY-PRODUCT CO., LTD., King's House, Kingsway, W.C.—Coke and by-products manufacturers and merchants. Nominal Capital, £200,000 in 200,000 shares of £1 each. Directors: A. Brichant, G. J. Phillips, C.B.E., P. N. Hambly.

OURY, MILLAR & CO. (AUSTRALASIA), LTD.—Gelatine and glue merchants. Nominal Capital, £20,000 in 20,000 shares of £1 each. Directors: S. J. Oury, Lillesdene, Esher, Surrey; A. B. Starke, 73, Southwark Street, S.E.; J. P. Madden, 53, Blenheim Park Road, South Croydon, Surrey; all permanent Directors. Qualification of Directors, one share.

PENTLEY SYNDICATE, LTD., 67, High Street, King's Lynn, Norfolk.—To acquire, prospect and work oilfields and oil and gas-bearing properties of all kinds. Nominal Capital, £100,000 in 100,000 shares of £1 each. Directors: A. G. Hawkins, Little Congham, King's Lynn, Norfolk; F. W. Ruston, Norden House, Chalteres, Cambs.; T. Dorrington, The Chestnuts, Wistow, Hunts; Captain J. D. C. Hawkins, 22, St. John's Park, Blackheath, S.E. Qualification of Directors, £500. Remuneration of Directors, £100 each.

SILVER & E. P. TRADES GLASS MANUFACTURERS, LTD.—Glass manufacturers. Nominal Capital, £10,000 in 10,000 shares of £1 each. Directors: W. J. Myatt, Argent Works, Frederick Street, Birmingham; J. Collyer, Hockley Hill, Frederick Street, Birmingham. Qualification of Directors, 100 ordinary shares.

National Chemical Works, Ltd.

A PETITION for the winding-up of the above company was presented to the County Court of Hertfordshire on March 23 by S. M. Buchan and C. Buchan, trading in partnership as A. W. Buchan & Co., stoneware manufacturers, Portobello Potteries, Portobello, creditors of the company, and the petition is directed to be heard at the Court House, St. Albans, on April 12 at 12 noon.

Reparation Dyes

AN important point has arisen in reference to the interpretation of the clause in the Peace Treaty relating to reparation dyes. There has been an impression that the Allies would be entitled to at least 25 per cent. of the pre-war production, but it is pointed out by one of the big German firms that the clause simply specifies "an amount not exceeding 25 per cent. of the total production." If the firm of Bayers, who are responsible for the statement referred to, is correct, then, of course, the 25 per cent. represents the maximum which the Allies may demand without any guarantee as to what Germany is bound to supply. The German firm referred to repeat, what is generally understood, that the pre-war scale of production is at present impossible, but speaking for the German dye firms, generally, they say they will do their utmost to give delivery to the Allied nations, and deny that they have agreed to give a preference to home consumers. The Allied control of the German factories ceased last month.

Benn Brothers Journals

Some Features of the Current Issues

AERONAUTICS.

"Cairo-Cape Flight," by Major C. C. Turner; "Subsidies"; "Direction-finding by Wireless."

THE CABINET MAKER.

"Weaving of Cane and Willow by Machinery"; "The Cutting of Loose Covers" (VIII.); "Colour Schemes for the Home."

THE ELECTRICIAN.

"Method of Correlation as applied to the Determination of Laws followed by the Results of Experiments," by H. Cotton; "Theory of Antenna Resistance," by W. H. Eccles, D.Sc.; "Electric Signalling at Victoria Station."

THE FRUIT-GROWER.

Conference at Wye College; "Work and Wages," by E. J. P. Benn; "Bird-life and Food Production."

THE GAS WORLD.

"Conservation of Heat in Gas Manufacture"; "Correct Use of Gas"; and Special Section dealing with the by-product coking in industry.

THE HARDWARE TRADE JOURNAL.

"Sale of Agricultural Machinery"; "Hardware and Engineering in Italy"; "Labour-Saving in the Foundry" (VII.), by Joseph Horner.

WAYS AND MEANS.

"Insurance as a Branch of Welfare Work," by the Editor; "Thirty Years' of Profit-Sharing," by H. Cooper; and "Labour Saving in the Home," by Mrs. Sanderson Furniss.

W. P. THOMPSON, F.C.S., M.I.Mech.E. G. C. DYMOND, M.I.Mech.E
W. P. THOMPSON & CO. 12, CHURCH STREET, LIVERPOOL.
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